AGRICULTURAL EDUCATION

Course Title	Recommended Grade Level						Recommended Credit ***
	7	8	9	10	11	12	
Agri-Biology ****			x	x	x	x	1
Agriscience Interdisciplinary ****			x	x	x	x	1
Agriscience Exploration	x	x					NA
Principles of Agr Sci & Tech		x	x				1
Agriscience			x	x	x	x	1
Animal Science				x	x		1
Equine Science					x	x	1
Animal Technology *					x	x	1
Adv. Animal Science **				x	x	x	1
Plant and Land Science				x	x		1
Crop Technology *					x	x	1
Adv. Plant Science **				x	x	x	1
Small Power & Equip				x	x	x	1
Agri. Construction Skills *				x	x	x	1
Agri. Structures & Design				x	x	x	1
Agriculture Power and Machinery Operation *				x	x	x	1
Floriculture & Floral Design *				x	x	x	1
Greenhouse Technology *				x	x	x	1
Landscape and Turf Management*				x	x	x	1
Nursery & Orchard Tech.*				x	x	x	1
Agri. Bus/Farm Mgmt *				x	x	x	1
Agri. Employability Skills				x	x	x	1
Agri. Sales & Marketing				x	x	x	1
Agri. Bio-Technology					x	x	1
Agri. Communication				x	x	x	1
Aquaculture				x	x	x	1
Environmental Tech.				x	x	x	1
Food Technology				x	x	x	1
Forestry				x	x	x	1
Small Animal Tech. *				x	x	x	1
Wildlife Resources				x	x	x	1
Adv. Wildlife Mgmt. **				x	x	x	1
Adv. Agri. Economics and Agribusiness Management **				x	x	x	1
Veterinary Science*				x	x	x	1

* These courses may be offered for additional units of credit providing the course content material in each section of the course is different.

** These courses may provide college credit when all course guidelines are met. Instruction provided over KET and coordinated by the local agriculture instructor.

*** All courses may be offered for less than one credit based on the local school schedule.

**** Interdisciplinary courses that meets the life science requirement for science credit.

AGRICULTURAL SCIENCE AND TECHNOLOGY OVERVIEW

Agricultural Science and Technology Education is designed to provide career exploration, orientation, and preparation for those students who have an interest in some aspect of agriculture. The knowledge and performance skills required for successful achievement and/or advancement in agricultural occupations constitute the central focus of the program. Students planning to attend college majoring in any field of agriculture or science would benefit from high school agricultural education.

The agricultural industry has many related occupational fields. Farming is no longer agriculture's primary occupation. Currently about 20 percent of all occupations are agriculturally related. Therefore, it is necessary to provide educational opportunities to students within this rapidly growing occupational field.

Each local Agricultural Education Program should offer courses that meet the needs of students and the local agriculture industry. It is recommended that courses be offered in various agricultural areas to provide students an opportunity to explore the various fields of agriculture and develop skills within these areas.

The Agricultural Education career cluster area contains 6 Career Majors. The 6 career majors are: Agriscience, Production, Horticulture, Agribusiness, Agricultural Mechanics/Engineering and Forestry/Resource Management. Students choosing to concentrate in Agricultural Education should select one of the 6 majors. This major should be listed on their Individual Graduation Plan. They also should be identified on the CATS Assessment as a "Career Major" concentrator in that same major area.

"Principles of Agricultural Science and Technology" and/or "Agriscience" are recommended as the first course students should enroll in as ninth graders; however, they are not required as a prerequisite to enrollment in other agricultural courses.

Students are encouraged to participate in cooperative education and other work-based learning experiences. Cooperative Education consists of in-school instruction combined with on-the-job work experience. Specific guidelines are outlined in 705 KAR 4:041. Information on other types of work-based learning are described in detail in the document Work-Based Learning Guide 2000, which is available on the KDE web page at:
www.kde.state.ky.us/careerandtechnicaleducation/resourcesandpublications

All courses consist of classroom instruction, related laboratory experiences, and supervised agricultural experience programs (entrepreneur or cooperative on-the-job placement, or other placement experiences). Each student enrolled must plan an agricultural experience program that complements the classroom instruction. Time shall be provided in the daily teaching schedule for both classroom instruction and supervision of experience programs. In addition to the general guidelines a Supervised Agriculture Experience (SAE) program can be assessed as an Entrepreneurship work-based experience.

FFA is the career and technical student organization available to students enrolled in agricultural education programs. The activities of the organization are an integral part of the instructional program. All students enrolled are encouraged to become members of the FFA and take advantage of the leadership, citizenship, and personal development training offered.

Each approved Agricultural Education Program shall have an active FFA chapter that provides

leadership development opportunities for all its members. Agricultural education teachers shall serve as FFA chapter Advisors.

AGRICULTURAL CAREER CLUSTERS

CAREER MAJORS

Agribusiness	Horticulture	Production
Agriscience Exploration (7th-8thGrade) - (no credit toward career major)		
Recommended Courses	Recommended Courses	Recommended Courses
Principles of Agricultural Science and Technology **Agriscience** **Ag. Business/Farm Mgmt.** **Ag. Employability Skills** **Ag. Sales & Marketing** **Adv. Ag. Economic and Agribusiness** Agriculture Bio-Technology Equine Science Greenhouse Technology Aquaculture Agricultural Communications Environmental Technology Food Technology Animal Technology Small Animal Tech Small Power and Equipment Veterinary Science	**Principles of Ag. Science & Tech.** **Agriscience** **Plant/Land Science** **Floriculture/Floral Design** **Greenhouse Technology** **Nursery /Orchard Technology** **Landscaping/Turf Mgmt** **Adv. Plant Science** Ag. Business/Farm Mgmt Ag. Construction Skills Ag. Employability Skills Ag. Sales and Marketing Ag. Structures & Designs Small Power Equipment Environmental Technology Agricultural Bio-Technology Agri-Biology Adv. Ag. Economics and Agribusiness Aquaculture	**Principles of Ag. Science & Tech.** **Agriscience** **Animal Science** **Plant & Land Science** **Animal Technology** **Crop Technology** **Equine Science** **Ag. Business/Farm Mgmt** **Adv. Animal Science** **Adv. Plant Science** **Small Power Equipment** **Veterinary Science** Agriculture Bio-Technology Aquaculture Ag. Employability Skills Ag. Sales and Marketing Ag. Construction Skills Small Power Equipment Ag. Power & Machinery Operation Ag. Structures & Designs Greenhouse Technology Small Animal Technology Agri-Biology Agricultural Bio-Technology Adv. Ag. Economics and Agribusiness
Elective Courses	Elective Courses	Elective Courses
• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses	• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses	• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses

- Other Career and Technical Education courses directly related to the student's Career Major.

- "Bolded" courses are the "primary recommended courses" for this career major. At least 2 of the 4 courses used to earn the career major should come from this group of courses.

AGRICULTURAL CAREER CLUSTERS

CAREER MAJORS - Continued

Agricultural Mechanics/ Engineering	**Forestry/Resource Management**	**Agriscience**
Agriscience Exploration (7^{th}-8^{th}Grade) – (No credit toward career major)		
Recommended Courses	Recommended Courses	**Recommended Courses**
Principles of Ag. Science and Technology **Agriscience** **Ag. Construction Skills** **Small Power Equipment** **Ag. Power and Machinery Operation** **Ag. Structures and Designs** Ag. Sales and Marketing Ag. Employability Skills Ag. Business/Farm Management Ag. Bio Technology	**Principles of Ag. Science and Technology** **Agriscience** **Forestry** **Environmental Technology** **Wildlife Resources** **Advanced Wildlife Management** **Aquaculture** Agricultural Bio-Technology Plant & Land Science Ag. Employability Skills Small Power Equipment Agri- Biology Nursery and Orchard Tech	**Agriscience** **Agri-Biology** **Adv. Animal Science** **Adv. Plant Science** **Agri. Bio-Technology** **Food Technology** **Environmental Technology** **Veterinary Science** Crop Technology Animal Technology Equine Science Animal Science Plant and Land Science
Elective Courses	Elective Courses	Elective Courses
• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses	• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses	• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses

- Other Career and Technical Education courses directly related to the student's Career Major.
- "Bolded" courses are the "primary recommended courses" for this career major. At least 2 of the 4 courses used to earn the career major should come from this group of courses.

To complete a career major, students must earn four career-related credits within the career major. Three of the four credits must come from the recommended courses for that major. Graduates for 2002 and beyond must meet the high school graduation requirements.

NOTE: Agribiology is an interdisciplinary course, which meets the graduation requirements for Life Science.

Agriscience Interdisciplinary course also meets the graduation requirements for Life Science.

MODEL COURSE SEQUENCE

AGRICULTURAL CAREER CLUSTER			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Plant & Land Science	Agricultural Construction Skills	Agricultural Employability Skills
	Small Power & Equipment	Agricultural Communications	Agribusiness/Farm Management
	Principles of Agriculture Science & Technology	Crop Technology	Agriculture Power & Machinery

AGRICULTURAL CAREER CLUSTER			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agricultural Communications	Agricultural Sales & Marketing	Environmental Technology
	Agriscience	Small Animal Technology	Agricultural Construction Skills
	Principles of Agricultural Science & Technology	Agri-Biology	Aquaculture

MODEL COURSE SEQUENCE

PRODUCTION CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Plant & Land Science	Animal Science	Agricultural Employability Skills
	Small Power & Equipment	Agri-Biology	Agribusiness/Farm Management
	Agriscience	Crop Technology	Advanced Animal Science
HORTICULTURE CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Plant and Land Science	Agricultural Sales & Marketing	Environmental Technology
	Agriscience	Greenhouse Technology	Advanced Plant Science
	Small Power and Equipment	Floricultural Floral Design	Landscaping/Turf Management

MODEL COURSE SEQUENCE

AGRIBUSINESS CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agriscience	Agricultural Communications	Food Technology
	Ag. Employability Skills	Equine Science	Agribusiness/Farm Management
	Ag. Sales and Marketing	Bio-Technology	Adv. Ag. Economics and Agribusiness Mgt.
AG MECHANICS/ENGINEERING CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agriscience	Ag Power & Machinery Operation	Ag Business/Farm Management
	Small Power & Equipment	Agricultural Structures & Design	Agricultural Construction Skills
	Ag Bio-Technology	Agriculture Sales & Marketing	Agricultural Employability Skills

MODEL COURSE SEQUENCE

FORESTRY/RESOURCES MANAGEMENT CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agriscience	Agri-Biology	Environmental Technology
	Wildlife Resources	Forestry	Agricultural Bio-Technology
	Plant and Land Science	Ag Employability Skills	Advanced Wildlife Management

AGRISCIENCE CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Agriscience	Adv. Animal Science	Environmental Technology	Agri Bio-Technology
	Adv. Plant Science	Food Technology	Crop Technology
	Plant and Land Science	Equine Science	Animal Technology
	Animal Science	Agri-Biology	Veterinary Science

AGRI-BIOLOGY DESCRIPTION

Agri-Biology is a one-credit interdisciplinary course that meets the “life science requirement” for science credit. This course may count as one of the three required credits in science for high school graduation. Agri-Biology uses agricultural contexts to present the required life science core content for assessment, as outlined in the program of studies. As students study practical agricultural concepts, they apply scientific ways of thinking and working to real-life problems. The agriculture teacher and science teacher work together in planning and evaluating the course.

AGRISCIENCE INTERDISCIPLINARY DESCRIPTION

Agriscience is a two-credit interdisciplinary course that meets the “life science requirement” for science credit. This “two-credit” course may count as one of the three required credits in science for high school graduation. Agriscience Interdisciplinary uses agricultural contexts to present the required life science core content for assessment, as outlined in the program of studies. In order to receive the “science credit” for high school graduation, students must complete the course “Agriscience”, to be followed by either “Advanced Plant Science” or “Advanced Animal Science”. Both of these courses (Advanced Plant Science & Advanced Animal Science) are dual credit courses that provide college credit when all course guidelines are met. The agriculture teacher and science teacher work together in planning and evaluating the course.

Agri-Biology

Course Overview:

This one-credit course uses agricultural contexts to present the life science content outlined in the *Program Studies*. As students study practical agricultural concepts, they apply scientific ways of thinking and working to real-life problems. During their study of agri-biology, students perform many practical tasks. They create models, extract DNA, analyze DNA fingerprints, construct tables and graphs to classify and analyze data, and test soils. Students also participate in cooperative and collaborative groups, use technology to solve problems, and participate in field trips to apply scientific concepts to agricultural and environmental problems. Students develop an understanding of many concepts such as cell structure and function, morphology and physiology of agriculturally significant animals, heredity principles and inheritance patterns, genetic engineering, animal behavior, biological change, interdependence of plants and animals, and the flow of matter and energy through ecosystems.

Models are organized around guiding questions. Guiding questions (in bold print) direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Essential questions may be included to further focus student learning.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding (in bold print) and essential questions along with related academic expectations and correlation to the and agri-biology content chart. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address content or content from elective areas, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding and Essential Questions:

How do cell structure, function, and processes affect living things?

What is the molecular basis of heredity?

• How does DNA affect organisms' morphology and physiology?

How do behavioral patterns ensure reproductive process?

• How do agriculturalists manipulate reproductive success?

What are the processes of biological change?

• How do agricultural crops and animals reflect diversity in nature?

How are organisms within ecosystems interdependent?

• How do agricultural processes alter ecosystems?

• How are croplands different from natural ecosystems?

How do organ systems work together to keep animals healthy?

What skills and knowledge must I have to be successful in an agricultural career in Kentucky?

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	How do cell structure, function, and processes affect living things?	**Students will** **Life Sciences** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate photosynthesis, cellular respiration, and energy. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • communicate recurring themes and processes of biology and chemistry that are common to all organisms. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • examine slides of various cell types from multicellular organisms. Discuss relationships between structure of different cell types and their functions. Determine common structures and functions of all cells. Create models of plant and animal cells, using biodegradable materials. Label and color code each organelle and describe its function. Identify organelles common to both and unique to each. • compare functions of cell organelles to school or city structures that have similar functions. Create multimedia presentations showing comparisons. • investigate use of microbes to produce substances needed by other plants, animals, and humans (e.g., insulin). Create illustrated flow charts, demonstrating processes. Write editorials, explaining need for increased funding for basic research in microbiology. *Use this activity to develop possible writing portfolio entries (WP - Transactive).* • research use of biotechnology and genetic engineering in development of new livestock breeds, plants, and disease control. Evaluate alternatives to genetic engineering methods. Evaluate impact of genetic engineering on their community and predict short- and long-term consequences. Develop policies that regulate use of genetic engineering. Present findings and recommendations to agricultural extension agents. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations for extension agents.* • investigate how and when cells differentiate. Read "How Does a Single Cell Become a Whole Body." Trace formation of germ layers and identify organ systems that develop from each layer. Create informational bulletin boards, collages, or posters to display in classrooms.	

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	How do cell structure, function, and processes affect living things?	**Students will** **Life Sciences** • investigate cell structures, and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • communicate recurring themes and processes of biology and chemistry that are common to all organisms. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • observe chicken embryos at 24, 48, and 72 hours of development. Record observations throughout incubation period, including humidity, temperature, turning rate, weight, and stage of maturity. Compare in graphic organizers features at different stages. Identify body structures of developing embryos and explain their functions. Investigate factors that interfere with embryonic development. Create multimedia presentations for poultry farmers to explain embryonic development. • investigate prenatal and postnatal growth and development. Compare growth rate of organ systems after animals are born. Write summaries in learning logs, describe growth rates of different organ systems and effect growth rate has on animals.	Julie needs to develop confidence in her ability to contribute positively in class. Her family owns and manages a poultry industry. Julie will arrange for her class to visit and observe the chick incubation and hatching process (*Types of extensions: motivation, participation).*

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What is the molecular basis of heredity?** How does DNA affect organisms' morphology and physiology?	**Students will** **Life Sciences** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. • compare anatomy, breeding, and reproduction of animal species.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • examine structure of DNA. Extract DNA from onion cells to observe color, texture, and thread-like structure. Construct models of DNA molecules and show locations of genes. Display models in science labs. Write articles for school newspapers concerning future applications of information derived from the Human Genome Project (*WP - Transactive*). • research use of DNA fingerprinting in food and animal science. Run DNA fingerprinting through electrophoresis to show how DNA fragmentation analysis can be used for identification. Create multimedia presentations explaining how public health safety workers track spread of bacteria (e.g., Listeria) and other pathogens. Explain procedure and results in learning logs. • read Watson's account of his discovery of DNA structure. Summarize method used and evidence gathered. Investigate lives of other researchers who were involved in discovery (e.g., Francis Crick, Rosalind Franklin, Maurice Wilkins). Write resumes for each researcher. • examine replication. Use models of DNA molecules to show how one DNA molecule can form exact duplicate of itself. • investigate protein synthesis, including transcription and translation. Explore evolutionary significance of common genetic language. Create models to demonstrate process. • distinguish between simple Mendelian inheritance (e.g., coat color in rabbits), multiple allelic inheritance, and polygenic inheritance (e.g., cob length in corn). • create hypothetical corn plants, using different colored paper clips for traits (e.g., height, leaf color, seed color). Record phenotypes and genotypes in learning logs. Investigate traits controlled by extranuclear DNA (e.g., mitochondrial). Determine inheritance patterns in plants (e.g., variegated leaf trait of Brassica rapa). Write feature articles for agricultural journals explaining differences in inheritance patterns (*WP - Transactive*). • study family relationships of livestock, using phenotypic records extending over two or more generations. Choose traits (e.g., dwarfism in Hereford cattle) and gather information about traits ancestors exhibited to complete pedigrees. Use Punnett squares to determine apparent inheritance patterns for that trait.	Betty and Agnes already have an understanding of DNA as it applies to genetics. They will use the Internet and other sources to discover new or potential uses for DNA technologies. They will communicate with forensic medicine specialists about their findings and create presentations to share with their class (*Types of extensions: magnitude, motivation, resources and materials, complexity*). Bryan and Melissa are able to learn with their peers, but have difficulty following directions. They will pair with classmates to investigate phenotypic and genotypic inheritance patterns (*Types of extensions: complexity, resources and materials*).

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What is the molecular basis of heredity?** How does DNA affect organisms' morphology and physiology?	**Students will** **Life Sciences** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. • compare anatomy, breeding, and reproduction of animal species.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • use sire summaries to distinguish between performance testing and progeny testing. Examine copies of pedigree papers of several animals of same breed. Compare animals based on pedigrees and performance records. Develop reports for agricultural advisory committees on beef breed improvement in their county. Investigate benefits of hybrid vigor. • research physical characteristics of economically important agricultural animals (e.g., sheep, cattle, swine). Determine whether traits are influenced more by genetics or environment. • obtain copies of dairy cattle sire catalogs and lineage classification data from dairy herds. Using data on females from herd records and data on sires from catalogs, choose most desirable sires for cows in that herd. Write introductions for catalogs describing how the information contained within can be used to improve herd quality *(WP - Transactive).*	

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How do behavioral patterns ensure reproductive success?** How do agriculturalists manipulate reproductive success?	**Students will** **Life Sciences** • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate behavioral responses. • analyze patterns of behavior. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare anatomy, breeding, and reproduction of animal species. • identify functions of plant structures. • identify environmental factors that affect crop production.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate life cycle of flowering plants. Create models, bulletin boards, or collages demonstrating cycles. Label all plant parts and describe function. Summarize in learning logs why knowledge of plant life cycles is important to agriculturalists. • investigate various forms of pollination (e.g., wind, water, insect). Create charts to compare forms of pollination in plant families. Investigate coevolution between plants and pollinators. Design and conduct investigations to determine effects of absence of pollinators on plant reproduction. Research use of bees as pollinators and diseases that have reduced bee populations. Write articles for agricultural journals explaining impact of reduced bee populations on crops *(WP - Transactive).* • investigate reactants and products of photosynthetic chemical reaction. Use light screens on Geranium leaves. Conduct iodine tests after several days to determine effects of light and absence of light on production of carbohydrates in leaves. Place *Elodea* plants into carbonate solutions under bright light. Count oxygen bubbles as they emerge from cut ends of *Elodea* plants. Analyze activities and produce an empirical word equation for photosynthetic chemical reaction. Investigate ways to increase or decrease rate of oxygen production. Compare photosynthesis in plants adapted to life in arid conditions with plants growing in Kentucky. • investigate vegetative propagation (e.g., rhizomes, stolens, tubers, grafting). Compare advantages and disadvantages to plants and humans of vegetative propagation over sexual reproduction. Propagate different species of plants in class and compare results. Distribute plants at parents' night. • research behaviors (e.g., social, reproductive, feeding) of agricultural animals. Determine how livestock producers deal with animal behaviors (e.g., feeding schedules, facility designs). Observe flock or herd animals, listing observed behaviors and determine which behaviors are instinctive and which are learned. Shadow county extension agents or veterinarians to determine how agriculturalists deal with problems related to livestock behaviors.	

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How do behavioral patterns ensure reproductive success?** How do agriculturalists manipulate reproductive success?	**Students will** **Life Sciences** • investigate behavioral responses. • analyze patterns of behaviors. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare anatomy, breeding, and reproduction of animal species. • identify functions of plant structures. • identify environmental factors that affect crop production.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • compare size and shape of sperm and egg cells of animal species. Check semen samples under microscopes for motility. Determine if any sperm cells are abnormal. Observe color, mobility, progressiveness, and abnormalities (e.g., tailless, two tails, two heads, pear-shaped heads). Examine prepared slides of ovary. Sketch ovary, including mature follicles and eggs. Prepare lab reports comparing features of each reproductive cell and explaining how traits of each help them perform their functions. • investigate codominance in livestock (e.g., shorthorn cattle). Design experiments to determine probability of different phenotypic expressions (e.g., coat color) in first and second generation offspring. Write lab reports detailing procedures and results to share with peers. ***Technology suggestion:*** *Use integrated software package to create tables and charts for analysis.* • research use of different breeding procedures in agricultural animals (e.g., horses, turkeys) and crops (e.g., corn). Write to breed associations to request information on disqualification of animals or plants for different breeds. Compare information from various associations. Interview livestock producers to determine traits for which they selectively breed. Investigate preferred plant traits in economically important crops. Research impact of selective breeding on agricultural animals and crops. Debate ethical and environmental implications of selective breeding. • demonstrate insemination process using female reproductive tracts acquired from biological supply houses or local slaughter houses. Identify different parts of female reproductive tracts. Identify appropriate insemination tools needed. Use tools to demonstrate insemination process, by placing dye solution in reproductive tract. Follow accepted procedures to dissect tracts to locate point where dye was deposited. Sketch reproductive tracts, identify parts, and describe steps of insemination process in lab reports. • survey local livestock producers to determine artificial insemination and embryo transfer techniques used. Investigate reasons for employing these techniques. Compare costs of semen and embryos from different breeders and examine reasons for cost differences. Write feature articles for agricultural journals explaining advantages and disadvantages of techniques *(WP - Transactive).*	Justin and Juanita have difficulty following directions. They are given instructions one day prior to assignment. They will be paired with peers to complete insemination procedures *(Types of extensions: time, motivation, environment, participation, demonstration of knowledge).*

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What are the processes of biological change?** How do agricultural crops and animals reflect diversity in nature?	**Students will** **Program of Studies** **Life Sciences** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify functions of plant structures. • identify structural, physiological and behavioral characteristics of vertebrates and invertebrates. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate history of domestication of economically important plants (e.g., wheat, corn, sugar cane). Create illustrated time lines to document milestones. ***Technology suggestion:*** *Use software to create time lines.* • create plant models, labeling, describing, and explaining each structure. Write children's books describing functions of plant parts *(WP - Transactive).* • examine plant cell structures with light microscopes. Create cell models, labeling basic cell structure (e.g., cell wall, cell membrane, nucleus, cytoplasm, chloroplast, vacuoles). Describe functions of cell structures on mechanical rather than biochemical level (e.g., nucleus and control of cell function, chloroplast and photosynthesis, mitochondria and respiration, cell membrane and transport). ***Technology suggestion:*** *Use light microscope or flex cams to examine cell structures.* • investigate plant defenses (e.g., poisons, thorns, hormones) and coevolution between plants and herbivores. Identify selective pressures acting on both herbivores and plants. Write news articles for agricultural journals explaining how plants reduce predation *(WP - Transactive).* • investigate irradiation on plant seeds to induce mutations and produce new varieties (e.g., peppers, soybeans, cotton, sugar cane, sunflowers, irises, roses, chrysanthemums, azaleas). Write articles about benefits and drawbacks of irradiation *(WP - Transactive).*	Willie and Ann understand cell structure and have participated in class discussions. They have difficulty manipulating objects and will work with small groups to produce models of cells *(Types of extensions: resources and materials, complexity, demonstration of knowledge).*

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What are the processes of biological change?** How do agricultural crops and animals reflect diversity in nature?	**Students will** **Life Sciences** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify functions of plant structures. • identify structural, physiological and behavioral characteristics of vertebrates and invertebrates. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • explore diversity among plants. Identify major highlights of plant evolution (e.g., vascular tissue) and impact on plant diversification. Identify divisions within plant kingdom and describe their characteristics and significant adaptations. Use graphic organizers to compare characteristics. Create bulletin boards, collages, or multimedia presentations on economic or medical importance of plants from each division, including local agricultural products. • compare monocot and dicot seeds. Place corn and bean seeds between wet blotters or paper towels and keep moist. Bisect and compare seeds after one day and after five days. Sketch, identify and label structures, and describe function of seed structures. • investigate evolution of various species (e.g., horses). Create murals depicting phylogenetic trees. Discuss how adaptations are advantageous to increased survival. • investigate early systems of classification (e.g., Aristotle). Compare Aristotle's system to that of Linnaeus. Create dichotomous keys for domestic plants and animals. Display in science lab.	
• examine differences between tamed and domesticated animals. Create collages, bulletin boards, or multimedia presentations for class members, explaining differences. Compare traits of wild and domesticated pigs. Identify traits that resulted from natural selection or selective breeding. Explain how wild pigs are adapted to their environment. Research history of breeds of livestock, including origin of animals, traits that were selected for through natural selection, traits that were selected for through selective breeding, and changes of breeds over time. Create illustrated histories of breeds to display at county fairs. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations.*	Bambi and Renee are interested in the domestication of certain animals. They finish their class assignment ahead of other students and develop short skits to share with the class on the domestication of cats and dogs *(Types of extensions: motivation, complexity, demonstration of learning).*

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How are organisms within ecosystems interdependent?** How do agricultural processes alter ecosystems? How are croplands different from natural ecosystems?	**Students will** **Life Sciences** • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • examine the factors that influence the interactions between organisms. • explore how human activities alter ecosystems. • recognize that living systems require energy. • analyze the flow of matter and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. **Agri-biology Content Chart** • identify environmental factors that affect crop production. • identify physical properties and biological components of soils.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate nitrogen cycle within biosphere. Examine nodules from roots of legumes (e.g., clover, alfalfa) under microscopes after staining with methylene blue. Sketch nitrogen-fixing bacteria. Write summaries in learning logs about importance of bacteria to nitrogen cycle. • investigate ways to change pH of soils. Interview agricultural extension agents to determine methods of changing pH. Analyze cost and efficacy of each method. Create how-to articles for agricultural publications *(WP - Transactive).* • design experiments to model processes that led to Dust Bowl of 1930s. Research soil conservation practices and techniques to prevent another Dust Bowl. Compare conservation practices and techniques of past with those of present in multimedia presentations. • investigate physical and chemical characteristics of ponds, springs, and rivers near agricultural cropland. Examine dissolved oxygen levels, turbidity, and bacterial growth. Compare data with students in other regions of Kentucky via Kentucky Water Watch Program. • investigate effects of pollutants (e.g., acid rain) on agricultural crops. Design and conduct investigations to measure acidity of rain water. Map Kentucky rain water acidity levels and compare crop loss due to pollutants with other Kentucky students. • investigate early and modern pesticides, comparing benefits of each. Debate effects of pesticides on beneficial organisms (e.g., soil invertebrates, insects, birds, mammals). Research pests (e.g., fungi, grasshoppers, corn borers) that damage major world crops. Research use of biological control of insects (e.g., ladybugs to control aphids). Produce articles for agriculturalists advocating biological control of pests (*WP - Transactive).* • investigate benefits and losses to crops due to recent weather patterns (e.g., floods, drought, wind, hail). Create collages of current news articles on agricultural impact by environmental forces. Research weather prediction techniques. Research current studies on causes of weather patterns (e.g., Arizona, 1998) and discuss validity of studies. Interview local agriculturalists to determine impact of economic losses due to weather. Write articles on impact weather has on agricultural crops and animals *(WP - Transactive).*	

High School Science
Agri-biology

Academic Expectations	Guiding Questions	Correlations to the Program Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How do organ systems work together to keep animals healthy?**	**Students will** **Life Science** • investigate cell structures and their functions. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify structural, physiological, and behavioral characteristics of vertebrates and invertebrates.

High School Science
Agri-biology

<table>
<tr><th colspan="2">Sample Activities</th><th>Sample Extensions for Diverse Learners</th></tr>
<tr><td colspan="2">Students will
• identify and describe organs and organ systems and anatomical structures of important agricultural animals. List organs common to all and those that differ. Explain physiological functions of each structure. Research common diseases that affect each system and methods used to diagnose and treat diseases. Create brochures to be distributed at county extension offices that describe diseases and treatments (WP - Transactive).</td><td></td></tr>
<tr><th>Academic Expectations</th><th>Guiding Questions</th><th>Correlations to the Program of Studies</th></tr>
<tr><td>Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)</td><td>What skills and knowledge must I have to be successful in an agricultural career in Kentucky?</td><td>Students will
Life Sciences
• examine the factors that influence the interactions between organisms.
Scientific Inquiry
All scientific inquiry bullets are included in this guiding question.
Applications/Connections
• apply scientific inquiry and conceptual understandings to solving problems of technological design.
• examine the interaction between science and technology.
• explore the impact of science on personal and community health.
• analyze how science and technology are necessary for solving issues.
• analyze the role science plays in everyday life and compare different careers in science.
• recognize that scientific knowledge is subject to change.
• investigate advances that have effects on science and society.
Agri-biology Content Chart
• compare appropriate health programs for animal species.
• identify major farm animal species, appropriate livestock enterprises, and their influence on world agriculture trends.
• explore career opportunities and</td></tr>
</table>

		job qualifications in agri-biology. • integrate FFA Leadership activities.

High School Science
Agri-biology

Sample Activities	Sample Extensions for Diverse Learners
Students will • examine contributions of livestock industry to society. Investigate use of animals and animal by-products in medical research and development of food products. Prepare multimedia presentations showing uses of animals and animal by-products. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations.* • investigate other issues of animal welfare (e.g., raising animals in confinement, animal health, management practices, continuous ingestion of antibiotics). Investigate role of food pyramid in determining proper diet selections for animals. Examine laws governing use of agricultural animals. Role-play public hearing between National Cattlemen's Association, United States Department of Agriculture official, People for the Ethical Treatment of Animals, and different types of vegetarians. Debate animal welfare issues. • search Internet for alternatives to Kentucky's tobacco crop. Investigate new and non-traditional crops as possible solutions. Research economic and social implications. Write letters to congressmen explaining results of research and recommendations for alternative crops *(WP - Transactive).* ***Technology suggestions:*** *Use Internet to conduct research. Use e-mail to communicate with congressmen.* • research scientific technologies (e.g., hydroponics, tissue culturing) that enhance agricultural endeavors. Create models of food supply systems using hydroponics and tissue culturing technology. Compare hydroponics method of growing crops to traditional methods. Debate advantages (e.g., reduction of labor costs) and disadvantages (e.g., disease introduction).	Teresa and Larry will create brochures to promote the introduction of new economic and agricultural crops for Kentucky. They will collaborate with agriculturalists (e.g., universities, colleges, county extension offices) to discover feasibiliy of their suggestions *(Types of extensions: motivation, complexity, demonstration of learning, resources and materials*).

Agriscience

Course Description: Agriscience introduces the scientific agricultural approach to animal science and selection, and plant and land science. Agricultural career opportunities will be emphasized in each class. Laboratory experiences relating to basic and current technology will be part of the program. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program and keep appropriate records.

Academic Expectations	Content/Process
	Students will
1.1, 2.1, 2.2, 2.3, 2.5, 2.6	• apply basic chemical and biological concepts to the production of food, including the interrelationships between soil and plants and the natural cycles which sustain all ecosystems.
2.1, 2.3, 2.6	• apply basic physiological and genetic principles to animal production systems.
2.1, 2.2, 2.3, 2.6	• investigate the impact of human activities on the environment and resource conservation and stewardship and interpret the impact of globalization on agriculture.
2.20, 2.6, 2.19	• examine the application of technology and genetic engineering in modern agriculture systems.
1.11, 2.13, 2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

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Curriculum Document

Program Area: Agricultural Education
Class: AGRISCIENCE
Text: *Agriscience 3rd Ed.*, Interstate, Lee & Turner, 2003
Date Revised: Fall, 2003

Course Description: Agriscience introduces the scientific agricultural approach to animal science and selection, and plant and land science. Agricultural career opportunities will be emphasized in each class. Laboratory experiences relating to basic and current technology will be part of the program. Utilizing the appropriate computer applications may enhance the content. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program and keep appropriate records.

Academic Expectations:

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.
1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.
1.10 Students organize information through development and use of classification rules and systems.
1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
1.12 Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.
2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.
2.3 Students identify and analyze systems and the ways their components work together or affect each other.
2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.
2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.
2.13 Students understand and appropriately use statistics and probability.
2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.
2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.
2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.
2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.
2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other post-secondary training or to get a job.

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Skills Standards: See Attachment

Core Content:

SC-H-2.2.1 Earth is a system containing essentially a fixed amount of each stable chemical atom or element. Each element can exist in several different reservoirs. Each element on Earth moves among reservoirs in the solid Earth, oceans, atmosphere, and organisms as part of geochemical cycles.

SC-H-2.2.2 Movement of matter between reservoirs is driven by Earth's internal and external sources of energy. These movements are often accompanied by a change in physical and chemical properties of the matter. Carbon, for example, occurs in carbonate rocks such as limestone, in the atmosphere as carbon dioxide gas, in water as dissolved carbon dioxide, and in all organisms as complex molecules that control the chemistry of life.

SC-H-3.1.2 Cells have particular structures that underlie their function. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules that form a variety of specialized structures. These structures carry out specific cell functions.

SC-H-3.1.3 Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell.

SC-H-3.1.3 Cells store and use information to guide their functions. The genetic information stored in DNA directs the synthesis of the thousands of proteins that each cell requires.

SC-H-3.1.4 Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through selective expression of individual genes. This regulation allows cells to respond to their internal and external environments and to control and coordinate cell growth and division.

SC-H-3.1.5 Plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms (e.g., *Euglena*) use solar energy to combine molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital link between the Sun and energy needs of living systems.

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SC-H-3.1.6 In the development of multicellular organisms, cells multiply and differentiate to form many specialized cells, tissues, and organs. This differentiation is regulated through the expression of different genes.

SC-H-3.2.1 Multicellular animals have nervous systems that generate behavior. Nerve cells communicate with each other by secreting specific molecules. Specialized cells in sense organs detect light, sound, and specific chemicals enabling animals to monitor what is going on in the world around them.

SC-H-3.2.2 Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species and/or other species, as well as environmental changes.

SC-H-3.2.3 The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic.

SC-H-3.3.1 Multicellular organisms, including humans, form from cells that contain two copies of each chromosome. This explains many features of heredity. Transmission of genetic information through sexual reproduction to offspring occurs when male and female gametes that contain only one representative from each chromosome pair unite.

SC-H-3.3.2 Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.

SC-H-3.4.1 Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms.

SC-H-3.4.2 The great diversity of organisms is the result of more than 3.5 billion years of biological change over time that has filled every available niche with life forms. The millions of different species of plants, animals, and microorganisms that live on Earth today are related by descent from common ancestors.

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SC-H-3.4.3 Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of their chemical processes.

SC-H-3.5.1 Atoms (e.g., carbon, nitrogen) and molecules (e.g., water) cycle among the living and nonliving components of the biosphere.

SC-H-3.5.2 Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.

SC-H-3.5.3 Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.

SC-H-3.5.5 Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected.

SC-H-3.6.1 Living systems require a continuous input of energy to maintain their chemical and physical organization since the universal tendency is toward more disorganized states. The energy for life primarily derives from the Sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing molecules. These molecules can be used to assemble larger molecules (e.g., DNA, proteins, sugars, fats). In addition, the energy stored in the bonds between the atoms can be used as sources of energy for life processes.

SC-H-3.6.2 The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store this energy temporarily in the phosphate bonds of ATP. During the process of cellular respiration, some energy is lost as heat.

SC-H-3.6.3 As matter and energy flow through different organizational levels (e.g., cells, organs, organisms, communities) and between living systems and the physical environment; chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.

MA-H-1.2.1 Students will perform addition, subtraction, multiplication, and division with real numbers in problem-solving situations to specified accuracy.

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MA-H-2.1.4 Students will describe properties of, define, give examples of, and apply to both real-world and mathematical situations ratio measures including slope and rate.

SCANS: (Workplace Skills). Secretary's Commission on Achieving Necessary Skills

Competencies

Resources: Identifies, organizes, plans, and allocates resources.

C3 Material and Facilities – Acquires, stores, allocates, and uses materials or space efficiently.

Information: Acquires and uses information.

C5 Acquires and evaluates information.
C6 Organizes and maintains information.
C7 Interprets and communicates information.
C8 Uses computers to process information.

Interpersonal: Works with others.

C9 Participates – Contributes to group effort.
C10 Teaches Others.

Technology: Works with a variety of technologies.

Resources: Identifies, organizes, plans, and allocates resources.
C18 Selects Technology – Chooses procedures, tools or equipment including computers and related technologies.
C19 Applies Technology to Task – Understands overall intent and proper procedure for setup and operation of equipment.
C20 Maintains and Troubleshoots Technology - Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Foundation Skills

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Reads, writes, performs arithmetic and mathematical operations, listens and speaks.

F1 Reading – Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
F2 Writing – Communicates thoughts, ideas, information, and messages in writing; and relates documents such as letters, directions, manuals, reports, graphs, and flow charts.
F3 Arithmetic – Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
F4 Mathematics – Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
F5 Listening – Receives, attends to, interprets, and responds to verbal messages and other cues.
F6 Speaking – Organizes ideas and communicates orally.

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons.

Systems: Understands complex interrelationships.

F7 Creative Thinking – Generates new ideas.
F8 Decision Making – Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
F9 Problem Solving – Recognizes problems and devises and implements plan of action.
F10 Seeing Things in the Minds Eye –Organizes, and processes symbols, pictures, graphs, objects, and other modifications to existing systems and information.
F11 Knowing How to Learn – Uses efficient learning techniques to acquire and apply new knowledge and skills.
F12 Reasoning – Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

F13 Responsibility – Exerts a high level of effort and perseveres towards goal attainment.
F14 Self-Esteem – Believes in own self-worth and maintains a positive view of self.
F15 Sociability – Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.
F16 Self-Management – Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

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F17 Integrity/Honestly – Chooses ethical courses of action.

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Technical Content (Agri-culture topics of instruc-tion)	**Ag Ed Programs of Studies "Content/ Process Statements"**	**Alignment to: Core Content, Academic Expectations, Skills Standards & SCANS**	**Teacher Activities** Instructional Activities (See Transformations)	**Learner Activities** "Students will be able to…" statements (Use Bloom's Taxonomy)	**Types of Assessment** (See Transformations)	**Resources**	**Length of Instructional Time**

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Intro to Ag Science and Tech. Food Nutrient Plant Parts Animal Prod.	**Apply basic chemical and biological concepts to the production of food, including the interrelationships between soil and plants and the natural cycles, which sustain all ecosystems.**	**Academic Expec.** 1.1, 2.1, 2.2, 2.3, 2.5, 2.6 Core Content SC-H-2.2.1, 2.2.2, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.2.1, 3.2.2, 3.2.3, 3.3.2, 3.3.3, 3.4.1, 3.4.2, 3.4.3, 3.5.1, 3.5.2, 3.5.3, 3.5.5, 3.6.1, 3.6.2, 3.6.3, MA-H-1.2.1, 2.1.4 **SCANS** (Utilizes all listed	**Part One** **Chapter 1**: Meeting human needs Define terms for the chapter Complete the end of chapter review questions. Chapter 2: Using science and Technology Define terms for the chapter Complete the end of chapter review questions.	1. Explain 3 basic human needs 2. Discuss major events in Ag history 3. List and Describe 3 areas of Ag industry 4. Relate areas of Agriscience that makes life better 5. Assess the role of consumers 6. Contrast world ag practices Explain Agriscience and technology Relate Agriscience and technology to 4 areas of science List and explain common areas of Agriscience Explain the scientific method and its use in research ID emerging tech in ag	Unit One Exam will cover part one, Chapters 1 & 2. Handouts on plant parts, nutrients, and wood products will be utilized. Handouts on Plant and Animal Production	Textbook Power Point Presenta-tion on Food, Fiber, and Shelter Textbook	3 Days 3 Days

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Curriculum Document

Program Area: Agricultural Education
Class: AGRISCIENCE
Text: *Agriscience 3rd Ed.*, Interstate, Lee & Turner, 2003
Date Revised: Fall, 2003

	Demonstrate employability and social skills relative to the career cluster. Maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions. Utilize activities of FFA as an integral component of course content and leadership development.	1.1, 2.36, 2.38 1.11, 2.13, 2.18 1.12, 2.16, 2.37	**Part Two** **Chapter 3:** Advancing in Agriscience Define terms for the chapter Complete the end of chapter review questions. **Chapter 4:** Learning in Agriscience Define terms for the chapter Complete the end of chapter review questions.	Identify career and entrepreneurship opportunities in Agriscience Develop appropriate interpersonal skills Describe safety practices in Agriscience Demonstrate appropriate citizenship Locate, assess, and use information in Agriscience Explain Ag Education Understand SAE programs Manage SAE programs Trace the history, purpose, and nature of the FFA Describe the organizational structure, keys to success, and common awards and events found in local FFA Chapters	Unit Two Exam will cover part one, Chapters 3 & 4. Career Inventory Survey Internet search	Textbook FFA Manual FFA Student Handbook www.ffa.org FFA videos Guest Speaker	4 Days

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Program Area: <u>Agricultural Education</u>
Class: <u>AGRISCIENCE</u>
Text: *Agriscience 3rd Ed.*, Interstate, Lee & Turner, 2003
Date Revised: Fall, 2003

	Investigate the impact of human activities on the environment and resource conservation and stewardship and interpret the impact of globalization on agriculture	1.1, 2.1, 2.2, 2.3, 2.5, 2.6	**<u>Part Three</u>** **Chapter 5**: Using natural resources Define terms for the chapter Complete the end of chapter review questions.	Explain sustainable use of environmental and natural resources Describe the role of ecosystems List examples of natural resources Discuss pollution and sources Examine methods of waste disposal including composting	Unit Two Exam will cover part one, Chapters 5, 6, & 7.	Textbook	

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Program Area: Agricultural Education
Class: AGRISCIENCE
Text: *Agriscience 3rd Ed.*, Interstate, Lee & Turner, 2003
Date Revised: Fall, 2003

	Examine the application of technology and genetic engineering in modern agriculture systems	2.20 2.6 2.19	**Chapter 6:** Determining the basis of life Define terms for the chapter Complete the end of chapter review questions.	Explain the important characteristics of organisms Explain the meaning of life span and its stages Discuss the processes of living organisms Describe the structural bases of living organisms ID cell growth processes Discuss the role of heredity and genetics			

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	Apply science, math and communication skills within the technical content.	1.9, 1.10, 1.12	**Chapter 7:** Classifying and naming living things Define terms for the chapter	Describe the classification system for living things Explain scientific names and match scientific manes with the common names of selected species Name and discuss the five kingdoms of organisms Properly identify the following: Kingdom Phylum Class Order Family Genus Species			

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	Apply basic physiological and genetic principles to animal and plant production systems.	2.1, 2.3, 2.6	**Part Four** Chapter 8: Applying plant science Chapter 9: Reproducing plants	Describe how plants are adapted to climate Explain plant life cycles Identify the major vegetative parts of plants and discuss their functions Explain the meaning and kinds of tropisms Explain plant reproduction ID and explain kinds & parts of seeds and flowers Describe germination and the needed conditions Explain uses of vegetative propagation Explain the importance of seed variety and quality			

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			Chapter 10: Producing plants	Describe how plants grow and the conditions needed for growth Explain photosynthesis and why it is important Explain transpiration and why it is important Name the nutrients plants need and describe how plants get them Describe nitrogen fixation in legumes Explain the use of fertilizer			

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			Part Five Chapter 12: Applying animal science Chapter 13: Feeding animals Chapter 14: Breeding animals **Part Six** Chapter 16: Using biotechnology				

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	Investigate the impact of human activities on the environment and resource conservation and stewardship and interpret the impact of globalization on agriculture.	2.1, 2.2, 2.3, 2.6	**Part Seven** Chapter 17: Applying earth science Chapter 18: Applying soil science **Part Eight** Chapter 19: Applying chemistry in Agriscience Chapter 20: Applying physics in Agriscience				

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	Examine the application of technology and genetic engineering in modern agriculture systems.	2.20, 2.6, 2.19	**Part Nine** Chapter 21: Marketing technology in Agriscience Chapter 22: Processing technology				

Advanced Animal Science

Course Description: A freshman-level college course which introduces students to a survey of genetics, reproductive physiology, growth and development, nutrition and digestive physiology, anatomy, meat science, animal classification, current issues and overviews of the dairy, poultry, equine, beef, sheep, swine, and aquaculture industries. Opportunity is provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.5, 2.20, 6.1, 6.2, 6.3	• Explain the domestication of livestock species and the subsequent impacts of human actions on these animal species.
1.1, 2.2, 2.3,2.5,2.7, 2.13,2.18,2.19,2.20,4.5 6.1, 6.2, 6.3	• Describe the national and international livestock industries including major producers, trends over time, economic importance, contributions to humanity and essential components.
1.1, 1.10, 1.11, 2.1, 5.1, 6.1, 6.2, 6.3	• Classify livestock using taxonomy, breed, purity, and market characteristics and be able to discuss the origin of the various classes.
2.5, 2.13, 5.1, 5.4, 5.5, 6.1, 6.2, 6.3	• Explain the genetic basis of heredity and discuss the manipulation of that system in the creation of improved livestock.
2.3, 2.5, 6.1, 6.2, 6.3	• Describe the growth and development of mammalian and avian livestock species from conception through birth or hatching, including sex cells, embryonic, and fetal stages.
2.2, 2.3, 6.2, 6.2, 6.3	• Diagram the male and female mammalian reproductive tracts and discuss the processes of gametogenesis, fertilization, gestation, parturition and lactation.
2.3, 2.4, 6.1, 6.2, 6.3	• Diagram the various digestive systems of livestock species and explain the major fermentative and biochemical processes which occur there and support all bodily functions.
2.7, 2.8, 2.29, 5.1, 5.4, 6.1, 6.2, 6.3	• Define nutrient, list the nutrient groups, explain their functions and explain how feeds are balanced to meet nutrient requirements of animals.
2.2, 6.1, 6.2, 6.3	• Discuss the creation of meat and dairy products from livestock, including the natural and fermentative processes involved.
2.2, 2.3, 2.5, 6.1, 6.2, 6.3	• Describe the aquaculture industry, including nutrient and carbon dioxide management, cultural systems, and important species.
2.5, 2.13, 2.19, 2.20, 4.6, 5.1, 6.1, 6.2, 6.3	• Differentiate among the beef, dairy, swine, sheep, equine, poultry and aquaculture industries, including management practices, production systems, end products and major regions of production in the U.S. and the world.
	• maintain records on supervised agricultural experience program and be able to

1.11, 2.13, 2.18 1.12, 2.16, 2.37 1.9, 1.10, 1.12	summarize and analyze results in making financial decisions. • utilize activities of FFA as an integral component of course content and leadership development. • apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Kentucky Department of Education, Division of Career and Technical Education
Curriculum Document

Program Area: Agricultural Education
Class: ADVANCED ANIMAL SCIENCE
Date Revised: FALL, 2003

Course Description: A college-freshman level course which surveys genetics, reproductive physiology, growth and development, nutrition and digestive physiology, anatomy, meat science, animal classification, current issues, and careers and overviews of the dairy, beef, sheep, swine, equine, poultry, and aquaculture industries. Opportunity is provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by using appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations:

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems
1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems
1.10 Students organize information through development and use of classification rules and systems
1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes
1.12 Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes
2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems
2.2 Student identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events
2.3 Student identify and analyze systems and the ways their components work together or affect each other
2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed
2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance
2.7. Students understand number concepts and use numbers appropriately and accurately
2.8 Students understand various mathematical procedures an use them appropriately and accurately
2.13 Students understand and appropriately use statistics and probability
2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups
2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living
2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations
2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective
2.29 Students demonstrate skills that promote individual well-being and healthy family relationships
2.36 Students use strategies for choosing and preparing for a career
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work
2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job
4.5 Students demonstrate an understanding of, appreciation for, and sensitivity to a multicultural and world view
4.6 Students demonstrate an open mind to alternative perspectives

5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations
5.4 Students use a decision-making process to make informed decisions among options
5.5 Students use problem-solving processes to develop solutions to relatively complex problems
6.1 Students connect knowledge and experiences from different subject areas
6.2 Students use what they already know to acquire new knowledge, develop new skills, or interpret new experiences
6.3 Students expand their understanding of existing knowledge by making connections with new knowledge, skills, and experiences

Skills Standards:

OA001	Apply principles of livestock nutrition
OA002	Apply principles of health management
OA003	Utilize appropriate livestock selection techniques
OA004	Understand principles of reproductive physiology and utilization of appropriate technology (synchronization, artificial insemination, embryo transfer)
OC002	Interpret the input of local, state, national, and international economy to production agriculture
OE005	Demonstrate knowledge of specialty agriculture markets
OF004	Formulate and evaluate rations
OH002	Recognize common plant and animal diseases
OH003	Apply appropriate prevention techniques and treatments of plant and animal diseases
OH004	Utilize understanding of plant and animal nutrition in the management and prevention of diseases
OH005	Utilize understanding of varieties and breeds in the management and prevention of diseases
OH006	Understand agriculture's relationship and responsibility to guarantee a safe food supply and a healthy environment
OI001	Utilize appropriate production techniques for livestock
OJ002	Identify and follow emergency, safety, and health rules/procedures
OK003	Identify related government agencies, their functions, and their programs' effects as they relate to the farm
OL003	Use appropriate agricultural terminology
OL004	Identify the anatomical parts of domestic livestock
OL005	Demonstrate knowledge of livestock breeds
OL006	Demonstrate knowledge of the livestock carcass
OL007	Recognize livestock pests
AA001	Read and process information and follow instructions
AA002	Read material and describe concepts
AB002	Apply basic math functions to solve problems
AB008	Calculate with percents, rate, ratio, and proportion with the use of a calculator
AC001	Understand scientific plant and animal classification
AC002	Compare the anatomical parts and distinguishing characteristics of plants and animals
AC003	Understand the reproductive processes of plant and animals
AC004	Analyze the process of plant and animal growth and development

AC005	Be aware of biotechnology and its uses in production agriculture
AC006	Explain the use of applied genetics in plants and animals

Core Content:

SC-H-1.3.1 Chemical reactions occur all around us and in every cell in our bodies. These reactions may release or consume energy

SC-H-1.3.2 Rates of chemical reactions vary. Reaction rates depend on concentration, temperature, and properties of reactants. Catalysts speed up chemical reactions.

SC-H-2.2.1 Earth is a system containing essentially a fixed amount of each stable chemical atom or element. Each element can exist in several different reservoirs. Each element on Earth moves among reservoirs in the solid Earth, oceans, atmosphere, and organisms as part of geochemical cycles.

SC-H-2.2.2 Movement of matter between reservoirs is driven by Earth's internal and external sources of energy. These movements are often accompanied by a change in physical and chemical properties of the matter. Carbon, for example, occurs in carbonate rocks such as limestone, in the atmosphere as carbon dioxide gas, in water as dissolve carbon dioxide, and in all organisms as complex molecules that control the chemistry of life.

SC-H-3.1.2 Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell.

SC-H-3.1.3 Cells store and use information to guide their functions. The genetic information stored in DNA directs the synthesis of the thousands of proteins that each cell requires.

SC-H-3.1.4 Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through selective expression of individual genes. This regulation allows cells to respond to their internal and external environments and to control and coordinate cell growth and division.

SC-H-3.1.6 In the development of multicellular organisms, cells multiply and differentiate to form many specialized cells, tissues, and organs. This differentiation is regulated through the expression of different genes.

SC-H-3.2.2 Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species and/or other species, as well as environmental changes.

SC-H-3.3.1 In all organisms and viruses, the instructions for specifying the characteristics are carried in nucleic acids. The chemical and structural properties of nucleic acids determine how the genetic information that underlies heredity is both encoded in genes and replicated.

SC-H-3.3.2 Multicellular organisms, including humans, form from cells that contain two copies of each chromosome. This explains many features of heredity. Transmission of genetic information through sexual reproduction to offspring occurs when male and female gametes that contain only one representative from each chromosome pair unite.

SC-H-3.3.3 Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.

SC-H-3.4.3 Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Species is the most fundamental unit of classification. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of the chemical processes.

SC-H-3.5.2 Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.

SC-H-3.5.3 Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.

SC-H-3.5.5 Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected.

SC-H-3.6.1 Living systems require a continuous input of energy to maintain their chemical and physical organization since the universal tendency is toward more disorganized states. The energy for life primarily derives from the Sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing molecules. These molecules can be used to assemble larger molecules (e.g., DNA, proteins, sugars, fats). In addition, the energy stored in the bonds between the atoms can be used as sources of energy for life processes.

SC-H-3.6.2 The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store this energy temporarily in the phosphate bonds of ATP. During the process of cellular respiration, some energy is lost as heat.

SC-H-3.6.3 As matter and energy flow through different organizational levels (e.g., cells, organs, organisms, communities) and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.

SCANS:

Content/process statements	Core content	Academic Expectations	Skills Standards	SCANS
Explain the domestication of livestock species and the subsequent impacts of human actions on these animal species	**SC-H-3.5.5**	**1.1, 2.5, 2.20, 6.1, 6.2, 6.3**	**AA002,**	
Describe the national and international livestock industries including major producers, trends over time, economic importance, contributions to humanity, and essential components	**SC-H-3.5.5**	**1.1, 2.2, 2.3, 2.5, 2.7, 2.13, 2.18, 2.19, 2.20, 4.5, 6.1, 6.2, 6.3**	**OC002, OH006, OK003, OL003, AA002,**	
Classify livestock using taxonomy, breed, purity, and market characteristics and be able to discuss the origin of the various species	**SC-H-3.3.3** SC-H-3.4.3	**1.1, 1.10, 1.11, 2.1, 5.1, 6.1, 6.2, 6.3**	**OH005, OL003, OL004, OL005, AA002, AC001, AC002**	
Explain the genetic basis of heredity and discuss the manipulation of that system in the creation of improved livestock	**SC-H-3.1.3** SC-H-3.1.4 SC-H-3.1.6 SC-H-3.3.1 SC-H-3.3.2 SC-H-3.3.3	**2.5, 2.13, 5.1, 5.4, 5.5, 6.1, 6.2, 6.3**	**OL003, AA001, AA002, AB008, AC005, AC006**	
Describe the growth and development of mammalian and avian livestock species from conception through birth or hatching, including sex cells, embryonic, and fetal stages	**SC-H-3.1.3** SC-H-3.1.4 SC-H-3.1.6 SC-H-3.3.2	**2.3, 2.5, 6.1, 6.2, 6.3**	**OA004, OL003, OL004, AA002, AC002, AC003, AC004, AC005, AC006**	
Diagram the male and female mammalian reproductive tracts and discuss the processes of gametogenesis, fertilization, gestation, parturition, and lactation	**SC-H-3.3.2**	**2.2, 2.3, 6.1, 6.2, 6.3**	**OA004, OL003, OL004, AA002, AC002, AC003**	
Diagram the various digestive systems of livestock species and explain the major fermentative and biochemical processes which occur there and support all bodily functions	**SC-H-1.3.1** SC-H-3.1.2 SC-H-3.5.3 SC-H-3.6.1 SC-H-3.6.2 SC-H-3.6.3	**2.3, 2.4, 6.1, 6.2, 6.3**	**OA001, OH004, OL003, OL004, AA002, AC002**	

Define nutrient, list the nutrient groups, explain their functions and sources, and explain how feeds are balanced to meet nutrient requirements of animals	**SC-H-3.1.2** SC-H-3.6.1 SC-H-3.6.2 SC-H-3.6.3	**2.7, 2.8, 2.29, 5.1, 5.4, 6.1, 6.2, 6.3**	**OA001, OF004, OH004, OL003, AA001, AA002, AB002, AB008,**	
Discuss the creation of meat and dairy products from livestock, including the biochemical and fermentative processes involved	**SC-H-1.3.1** SC-H-3.1.2	**2.2, 6.1, 6.2, 6.3**	**OA002, OI001, OJ002, OK003, OL003, OL004, OL006, AA002, AC002**	
Describe the aquaculture industry, including nutrient and carbon dioxide management, cultural systems, and important species	**SC-H-2.2.1** SC-H-2.2.2 SC-H-3.6.1 SC-H-3.6.3	**2.2, 2.3, 2.5, 6.1, 6.2, 6.3**	**OA001. OE005, OL003, OL004, AA002,**	
Differentiate among the beef, dairy, swine sheep, equine, poultry, and aquaculture industries, including management practices, production systems, end products, and major regions of production the US and world	**SC-H-3.2.2** SC-H-3.4.3 SC-H-3.5.2 SC-H-3.5.5	**2.5, 2.13, 2.19, 2.20, 4.6, 5.1, 6.1, 6.2, 6.3**	**OA001, OA002, OA003, OA004, OC002, OF004, OH002, OH003, OH004, OH005, OH006, OI001, OL003, OL004, OL005, OL006, OL007, AA001, AA002, AC002, AC003, AC004, AC005, AC006**	

Advanced Plant Science

Course Description: A freshman college-level course which introduces students to the world of plants. The course is a survey of botany, agronomy, horticulture, soils, forestry, and other areas of plant science. Opportunity is provided for students to earn three (3) hours of introductory college credit.
Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1,1.10,2.2,2.6	• discuss evolution and the classification of plants
2.19,2.20,2.36	• explain the significance of plant science to fulfill basic human needs.
2.2,2.3,2.4,2.6	• differentiate between sexual and asexual plant propagation and reproduction.
2.1,2.2,2.3,2.5	• assess the environmental factors affecting plant growth and development.
2.1,2.2,2.3,2.4	• determine plant processes such as photosynthesis, respiration, and other processes.
2.2,2.3,2.4,2.5	• relate genetic processes to plant breeding and crop production.
2.2,2.3,2.4,2.5	• examine the plant cell and its related structures.
2.2,2.3,2.4,2.5	• explain seed germination and life cycles.
2.2,2.4,2.6	• summarize the physical and chemical properties of soil and other plant growing media.
2.2,2.3,2.4,2.5	• relate harvest and post harvest processes to various plants.
2.2,2.3,2.4,2.5	• appraise plant pest control and management.
2.2,2.3,2.4,2.5	• review plant ecosystems and sustainability
1.11,2.13,2.18 1.12,2.16,2.37	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
	• utilize activities of FFA as an integral component of course content and leadership development.
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Course Description:

A college –freshman level course which introduces students to the world of plants. The course is a survey of botany, agronomy, horticulture, soils, forestry, and other areas of plant science. Opportunity is provided for students to earn three (3) hours of introductory college credit. Contents may be enhanced by using appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations:

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.

1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.

1.10 Students organize information through development and use of classification rules and systems.

1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.

1.12 Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.

2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.

2.3 Students identify and analyze systems and the ways their components work together or affect each other.

2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.

2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.

2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.

2.13 Students understand and appropriately use statistics and probability.

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

2.36 Students use strategies for choosing and preparing for a career.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other post-secondary training or to get a job.

Skills Standards:

ED001	Organize materials with a logical flow.
ED002	Interpret and clarify directions prepared by others.
EE001	Apply a system of problem solving.
AA001	Read and process information and follow instructions.
AA002	Read material and describe concepts.
AA003	Use correct terminology.
AA004	Use correct spelling, grammar and punctuation.
AA005	Write with accuracy, brevity, and clarity.
AA008	Demonstrate understanding of basic of interpersonal communication (listening, written, oral, etc.).
AA009	Implement new process steps given oral instructions.
AA015	Demonstrate good speaking and presentation characteristics.
AA016	Demonstrate basic leadership skills.
AB002	Apply basic math functions to solve problems.
AB006	Document results of measurement activities and calculations
AB007	Calculate with percents, rate, ratio, and proportion with the use of a calculator.
AC001	Understand scientific plant classification.
AC002	Compare the anatomical parts and distinguishing characteristics of plants.
AC003	Understand the reproductive processes of plants.
AC004	Investigate sexual and asexual reproduction of plants including tissue culture.
AC005	Analyze the process of plant growth and development.
AC006	Be aware of biotechnology and its uses in horticulture production.
AC007	Explain the use of applied genetics in plants.

Core Content:

Students will:
-discuss evolution and the classifications of plants
-examine plant cells and its related structures
-explain seed germination and life cycles
-explain the significance of plant science to fulfill basic human needs
-differentiate between sexual and asexual plant propagation and reproduction
-assess the environmental factors affecting plant growth and development
-determine plant processes such as photosynthesis, respiration, and other processes
-relate genetic processes to plant breeding and crop production
-summarize the physical and chemical properties of soil and other plant growing media
-relate harvest and post harvest processes to various plants
-appraise plant pest control and management
-review plant ecosystems and sustainability
-demonstrate employability and social skills relative to the career cluster
-maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions
-utilize activities of FFA as an integral component of course content and leadership development

Science Core Content:
Grades 8 through 11 with Assessment at Grade 11-Life Science

The Cell

SC-H-3.1.1 Cells have particular structures that underlie their function. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules that form a variety of specialized structures. These structures carry out specific cell functions.

SC-H-3.1.2 Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell.

SC-H-3.1.3 Cells store and use information to guide their functions. The genetic information stored in DNA directs the synthesis of the thousands of proteins that each cell requires.

SC-H-3.1.4 Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through selective expression of individual genes. This regulation allows cells to respond to their internal and external environments and to control and coordinate cell growth and division.

SC-H-3.1.5 Plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms (e.g., *Euglena*) use solar energy to combine molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital link between the Sun and energy needs of living systems.

SC-H-3.1.6 In the development of multicellular organisms, cells multiply and differentiate to form many specialized cells, tissues, and organs. This differentiation is regulated through the expression of different genes.

The Molecular Basis of Heredity

SC-H-3.3.1 In all organisms and viruses, the instructions for specifying the characteristics are carried in nucleic acids. The chemical and structural properties of nucleic acids determine how the genetic information that underlies heredity is both encoded in genes and replicated.

SC-H-3.3.2 Multicellular organisms, including humans, form from cells that contain two copies of each chromosome. This explains many features of heredity. Transmission of genetic information through sexual reproduction to offspring occurs when male and female gametes that contain only one representative from each chromosome pair unite.

SC-H-3.3.3 Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.

Biological Change

SC-H-3.4.1 Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms.

SC-H-3.4.2 The great diversity of organisms is the result of more than 3.5 billion years of biological change over time that has filled every available niche with life forms. The millions of different species of plants, animals, and microorganisms that live on Earth today are related by descent from common ancestors.

SC-H-3.4.3 Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Species is the most fundamental unit of classification. Different species are classified by the comparison and analysis of their internal and external structures and the similarity of their chemical processes.

The Interdependence of Organisms

SC-H-3.5.1 Atoms (e.g., carbon, nitrogen) and molecules (e.g., water) cycle among the living and nonliving components of the biosphere.

SC-H-3.5.2 Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.

SC-H-3.5.3 Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.

SC-H-3.5.5 Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected.

Matter, Energy, and Organization in Living Systems

SC-H-3.6.1 Living systems require a continuous input of energy to maintain their chemical and physical organization since the universal tendency is toward more disorganized states. The energy for life primarily derives from the Sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing molecules. These molecules can be used to assemble larger molecules (e.g., DNA, proteins, sugars, fats). In addition, the energy stored in the bonds between the atoms can be used as sources of energy for life processes.

SC-H-3.6.2 The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store this energy temporarily in the phosphate bonds of ATP. During the process of cellular respiration, some energy is lost as heat.

SC-H-3.6.3 As matter and energy flow through different organizational levels (e.g., cells, organs, organisms, communities) and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.

SCANS:

C2 Money – Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.

C3 Material and Facilities – Acquires, stores, allocates, and uses materials or space efficiently.
C5 Acquires and evaluates information.
C6 Organizes and maintains information.
C7 Interprets and communicates information.
C8 Uses computers to process information.
C9 Participates – Contributes to group effort.
C10 Teaches Others.
C11 Serves Clients/Customers – Works to satisfy customers' expectations.
C12 Exercise Leadership – Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
C15 Understands Systems – Knows how social, organizational, and technological systems work and operates effectively with them.
C16 Monitors and Corrects Performance –Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
C18 Selects Technology – Chooses procedures, tools or equipment including computers and related technologies.
C19 Applies Technology to Task – Understands overall intent and proper procedure for setup and operation of equipment.
C20 Maintains and Troubleshoots Technology - Prevents, identifies, or solves problems with equipment, including computers and other technologies.
F1 Reading – Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
F2 Writing – Communicates thoughts, ideas, information, and messages in writing; and relates documents such as letters, directions, manuals, reports, graphs, and flow charts.
F3 Arithmetic – Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

F4 Mathematics – Performs basic computations and approaches practical problems by choosing ppropriately from a variety of mathematical techniques.
F5 Listening – Receives, attends to, interprets, and responds to verbal messages and other cues.
F6 Speaking – Organizes ideas and communicates orally.
F7 Creative Thinking – Generates new ideas.
F8 Decision Making – Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
F9 Problem Solving – Recognizes problems and devises and implements plan of action.
F11 Knowing How to Learn – Uses efficient learning techniques to acquire and apply new knowledge and skills.
F12 Reasoning – Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.
F13 Responsibility – Exerts a high level of effort and perseveres towards goal attainment.
F14 Self-Esteem – Believes in own self-worth and maintains a positive view of self.
F15 Sociability – Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.
F16 Self-Management – Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

F17 Integrity/Honestly – Chooses ethical courses of action.Technical Content	**Academic Expectations**	**Science Core Content: Life Science**	**Skill Standards**	**SCANS**
discuss evolution and the classifications of plants	1.1, 1.2, 1.10, 2.2, 2.6, 5.3	SC-H-3.4.1, SC-H-3.4.3	ED001, EE001, AA001, AA002, AA003, AC001,	F1, F2, F6, F11, F12, F13, F16, F17, C5, C6, C7, C11
examine plant cells and its related structures	1.1, 1.2, 2.2 2.3, 2.4, 2.5	SC-H-3.1.1, SC-H-3.1.3, SC-H-3.1.4, SC-H-3.1.5	AA001, AA002, AA003, AC002	C7, C15, F1, F2, F6, F11, F12
explain seed germination and life cycles	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6	SC-H-3.51, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5	AA001, AA002, AA003, AC003, AC004, AC005	C5, C7, C15, F1, F2, F6, F11, F12
explain the significance of plant science to fulfill basic human needs	2.19. 2.20, 2.36	SC-H-3.5.5, SC-H-3.6.1	AC007	C7, C15, F1, F11

differentiate between sexual and asexual plant propagation and reproduction	2.2, 2.3, 2.4, 2.6	SC-H.3.3.1, SC-H-3.32, SC-H-3.3.2, SC-H-3.4.1,	AC004, OC001	C5, C15, C16, F1, F8, F12, F13, F16
assess the environmental factors affecting plant growth and development	1.3, 2.1, 2.2, 2.3, 2.5	SC-H-3.5.1, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5	OD002, EA007, EE001	C5, C6, C7, C9, C12, C16, C18, C19, C20, F2, F6, F8, F9, F11, F12, F13, F14, F16
determine plant processes such as photosynthesis respiration, and other processes	2.1, 2.2, 2.3, 2.4	SC-H-3.1.2, SC-H-3.1.5, SC-H-3.1.6, SC-H-3.3.1 SC-H-3.3.2, SC-H-3.3.3 SC-H-3.6.1, SC-H-3.6.2	OD002, AC003, AC005	C5, C6, C15, C16, C18, C19, F1, F8, F12, F13, F16
relate genetic processes to plant breeding and crop production	2.2, 2.3, 2.4, 2.5	SC-H-3.3.1, SC-H-3.3.2, SC-H-3.3.3	AC006, AC007	C5, C7, C15, F1, F11, F12
summarize the physical and chemical properties of soil and other plant growing media	2.2, 2.4. 2.6	SC-H-3.5.1, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5	OB001, OB002, OB003, OB004, OB006	C5, C7, C18, C19, F2, F3, F6, F11, F12

relate harvest and post harvest processes to various plants	2.2, 2.3, 2.4, 2.5		OD003, AC006	C5, C6. C12. C15, F1, F12
appraise plant pest control and management	2.2, 2.3, 2.4, 2.5		OE001, OE002, OE003, OE004	C3, C5, C7, C9, C10, C15, C19, C20, F1, F5, F8, F9, F12, F13, F17
review plant ecosystems and sustainability	2.2, 2.3, 2.4, 2.5	SC-H-3.5.1, SC-H-3.5.2, SC-H-3.5.3, SC-H-3.5.5, SC-H-3.6.3	AC005	C5, C15, F1, F12
demonstrate employability and social skills relative to the career cluster	1.1, 2.36, 2.38		OA002, OA003, OG003, OG004, OG005, OG006, OG007, OG009, OG0010, OH003, EA001, EA002, EA003, EA004, EA005, EA006, EA011, EA012, EA013	C5, C6, C7, C8, C9, C11, C12, C15, C16, C18, C19, C20, F1, F2, F3, F4, F5, F6, F7, F8, F9, F11, F12, F13, F14, F15, F16, F17
maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions	1.11, 2.13, 2.18		EC002, EC003, EC004, EC009, AB006, AB008	C2, C5, C6, C7, C19, F3, F4, F12, F17,

utilize activities of FFA as an integral component of course content and leadership development	1.12, 2.16, 2.37		ED006, AA010, AA011, AA012, AA013, AA014, AA015, AA016	C6, C7, C9, C12, F2, F5, F6, F13, F14, F16, F17

Agriscience Exploration

Course Description: The course content focuses on exploring current and future agricultural careers as well as the historical events that molded the industry. The local agricultural industry is emphasized, and the local high school program and FFA activities are featured. Leadership development will be provided through FFA. Classroom, laboratory and field trip experiences should be provided.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• summarize careers in agriculture and list verifiers of workplace readiness.
1.1, 2.3, 2.20	• review the historical importance of the agricultural industry and how agriculture shaped world history.
2.36, 3.4	• identify and research careers in agriculture.
3.7, 5.1	• conduct a career self-analysis.
5.4	• visit the agricultural department at the high school and become acquainted with the curricula.
3.1	• recognize the opportunities for leadership development provided by the FFA organization.
2.7	• relate the importance of agriculture in the local, state, national, and global economies.
1.3	• identify tools, equipment and materials common in agriculture.
2.1,2.2,2.16	• identify current, major contemporary issues in agriculture.
1.16	• give examples of the new technological developments in agriculture.
2.29	• examine basic home and farm safety.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Principles of Agricultural Science and Technology

Course Description: This course provides instruction in the foundations of the various segments of the agricultural industry. Agricultural career opportunities will be emphasized. Animal science, plant and land science, and agricultural mechanics skills will be the focus of the curriculum. The selection and planning of a supervised agricultural experience program and related record keeping will be presented. Leadership development will be provided through FFA. Students will receive personal guidance and counseling with preparatory instructional program selection.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.13,2.18, 3.0	• develop a supervised agricultural experience programs including use of record keeping.
1.12,1.9,2.38	• explore basic agricultural skills needed including: math, communication, and employability skills.
2.1, 2.3, 2.6	• identify and examine general soil and plant sciences.
2.1, 2.3, 2.6	• identify and examine general animal sciences.
2.37,2.4,2.7	• demonstrate basic agricultural mechanics and construction skills.
2.6, 2.19, 2.20	• investigate basic environmental, food and fiber interrelationships.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• participate in FFA leadership activities which are integrated into the course.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agriscience

Course Description: Agriscience introduces the scientific agricultural approach to animal science and selection, and plant and land science. Agricultural career opportunities will be emphasized in each class. Laboratory experiences relating to basic and current technology will be part of the program. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program and keep appropriate records.

Academic Expectations	Content/Process
	Students will
1.1, 2.1, 2.2, 2.3, 2.5, 2.6	• apply basic chemical and biological concepts to the production of food, including the interrelationships between soil and plants and the natural cycles which sustain all ecosystems.
2.1, 2.3, 2.6	• apply basic physiological and genetic principles to animal production systems.
2.1, 2.2, 2.3, 2.6 2.20, 2.6, 2.19	• investigate the impact of human activities on the environment and resource conservation and stewardship and interpret the impact of globalization on agriculture.
	• examine the application of technology and genetic engineering in modern agriculture systems.
1.11, 2.13, 2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Animal Science

Course Description: Animal Science develops basic knowledge and skills pertaining to livestock identification, selection, nutrition, reproduction and genetics, health management, and marketing of one or more species of farm animals. The latest biotechnological applications will be included. The content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.20,2.36,4.5	• relate the benefits of animals to human kind in local, national and world agriculture.
2.3, 5.3	• utilize proper animal science terminology.
2.3, 2.6, 2.20	• distinguish various breeds of livestock.
1.11,2.3,4.2,4.6	• select and evaluate livestock.
2.1,2.2,2.3,5.4	• apply reproductive principles to breeding practices of livestock.
2.1,2.2,2.3,5.3	• summarize digestive principles to livestock nutrition practices.
2.1,2.2,2.6, 5.1	• evaluate proper animal health techniques in the livestock industry.
2.1,2.2,2.3,2.4	• apply biotechnological principles to the livestock industry.
2.2, 2.16, 2.29	• relate animal agriculture to the environment.
2.13, 2.18	• evaluate animal products and by-products of the livestock industry.
1.11, 2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Equine Science

Course Description: Equine science develops knowledge and skill pertaining to breed identification and selection, anatomy, physiology, nutrition, genetics and reproductive management, training principles, grooming, health disease, parasite control and sanitation practices. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1,2.36,2.38	• demonstrate employability and social skills relative to the career cluster.
2.36, 4.5, 6.3	• relate the benefits of the equine industry to humankind in local, national, and world agriculture.
1.10,2.6,4.3	• contrast equine anatomy, physiology and soundness of different breeds.
2.1,2.2,2.3	• relate the anatomy and physiology of the equine digestive system to proper nutritional practices.
2.1,2.2,2.6	• utilize health and sanitation practices in the equine industry.
1.15,2.3,2.37	• demonstrate proper grooming and handling techniques in the equine industry.
2.19,2.20,2.3	• evaluate the role of equine domestication and the various types of equine in the world today.
2.1, 2.2, 2.3	• identify the anatomy and physiology of the equine reproductive system and utilize proper breeding techniques.
1.15,2.3,2.37	• utilize proper horsemanship and showmanship practices in the equine industry.
1.15,2.2,2.4	• determine the various training principles in the equine industry.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,4.0	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Animal Technology

Course Description: Animal Technology instruction concentrates on the advanced production practices and current biotechnological applications of one or more species of farm animals, based on the local community needs. Hands-on experiences will be emphasized. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.1,2.2,2.3,5.4	• utilize proper breeding management principles and techniques in the livestock industry.
2.2, 2.9, 1.1 2.1,2.2,2.3,5.3	• utilize proper housing/handling principles and techniques in the livestock industry. • utilize proper feeds/feeding principles and techniques in the livestock industry.
2.7, 2.13, 2.30	• demonstrate proper sanitation/health management principles and techniques in the livestock industry.
2.7, 2.13, 2.30	• utilize proper marketing principles and techniques used in the livestock industry.
2.1,2.2,2.3,2.4	• apply biotechnology to the livestock industry and relate impact of animal agriculture to the environment.
2.1,2.2,2.3,5.4	• utilize various animal husbandry practices in the livestock industry.
2.1,2.2,4.3,5.4	• utilize advanced principles and techniques of beef cattle, dairy cattle, swine, sheep, poultry, and specialty animal management.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Advanced Animal Science

Course Description: A freshman-level college course which introduces students to a survey of genetics, reproductive physiology, growth and development, nutrition and digestive physiology, anatomy, meat science, animal classification, current issues and overviews of the dairy, poultry, equine, beef, sheep, swine, and aquaculture industries. Opportunity is provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.5, 2.20, 6.1, 6.2, 6.3	• Explain the domestication of livestock species and the subsequent impacts of human actions on these animal species.
1.1, 2.2, 2.3,2.5,2.7, 2.13,2.18,2.19,2.20,4.5 6.1, 6.2, 6.3	• Describe the national and international livestock industries including major producers, trends over time, economic importance, contributions to humanity and essential components.
1.1, 1.10, 1.11, 2.1, 5.1, 6.1, 6.2, 6.3	• Classify livestock using taxonomy, breed, purity, and market characteristics and be able to discuss the origin of the various classes.
2.5, 2.13, 5.1, 5.4, 5.5, 6.1, 6.2, 6.3	• Explain the genetic basis of heredity and discuss the manipulation of that system in the creation of improved livestock.
2.3, 2.5, 6.1, 6.2, 6.3	• Describe the growth and development of mammalian and avian livestock species from conception through birth or hatching, including sex cells, embryonic, and fetal stages.
2.2, 2.3, 6.2, 6.2, 6.3	• Diagram the male and female mammalian reproductive tracts and discuss the processes of gametogenesis, fertilization, gestation, parturition and lactation.
2.3, 2.4, 6.1, 6.2, 6.3	• Diagram the various digestive systems of livestock species and explain the major fermentative and biochemical processes which occur there and support all bodily functions.
2.7, 2.8, 2.29, 5.1, 5.4, 6.1, 6.2, 6.3	• Define nutrient, list the nutrient groups, explain their functions and explain how feeds are balanced to meet nutrient requirements of animals.
2.2, 6.1, 6.2, 6.3	• Discuss the creation of meat and dairy products from livestock, including the natural and fermentative processes involved.
2.2, 2.3, 2.5, 6.1, 6.2, 6.3	• Describe the aquaculture industry, including nutrient and carbon dioxide management, cultural systems, and important species.
2.5, 2.13, 2.19, 2.20,	

4.6, 5.1, 6.1, 6.2, 6.3 1.11, 2.13, 2.18	• Differentiate among the beef, dairy, swine, sheep, equine, poultry and aquaculture industries, including management practices, production systems, end products and major regions of production in the U.S. and the world.
1.12, 2.16, 2.37	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.9, 1.10, 1.12	• utilize activities of FFA as an integral component of course content and leadership development. • apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Plant and Land Science

Course Description: Plant and Land Science develops basic scientific knowledge and skills pertaining to management of the land and its effects on food and fiber production, the environment, and the quality of life. The relationship of land to plant growth will be emphasized. Plant composition, reproduction, growth, and current biotechnological advances will be included. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.19,2.20,2.36	• assess the benefit of plants and land to human kind in local, national, and world agriculture.
2.2, 2.4, 2.6	• relate the physical properties of soil to plant and land use.
2.2, 2.4, 2.6	• relate the chemical properties of soil to plant and land use.
2.2, 2.4, 2.6	• relate the biological properties of soil to plant and land use.
2.2,2.15,2.20	• critique the principles of good land use.
4.1,2.2,2.4	• select appropriate plant nutrition practices and management.
2.1,2.2,2.4,2.6	• examine the processes for plant development, growth, and reproduction.
2.1,2.2,2.4,2.3	• relate biotechnology to plant production.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Crop Technology

Course Description: Crop Technology instruction concentrates on the production practices and current biotechnological applications of or more agriculture crops. Hands-on experiences will be emphasized. Instruction will include variety selection, seed bed preparation, fertilization, pest, weed and disease control, harvesting, and marketing crops. Current biotechnological applications may be included. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.19,2.20,2.36	• specify the benefit of crop production in local, national, and world agriculture.
2.2,2.10,2.19	• relate the economic factors of crop production in local, national, and world agriculture.
2.2,2.6,2.19	• evaluate environmental factors of crop production in local, national, and world agriculture.
2.2,2.4,2.3,2.6	• determine the impact of soil and water resources on crop production.
2.2,2.6,2.9,5.1	• utilize management practices in row crops.
2.2,2.6,2.9,6.3	• utilize management practices in small grains.
2.2,2.6,2.9,5.1	• utilize management practices in forages/pastures.
2.1,2.2,2.3,2.4	• relate biotechnology to plant production.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Advanced Plant Science

Course Description: A freshman college-level course which introduces students to the world of plants. The course is a survey of botany, agronomy, horticulture, soils, forestry, and other areas of plant science. Opportunity is provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1,1.10,2.2,2.6	• discuss evolution and the classification of plants
2.19,2.20,2.36	• explain the significance of plant science to fulfill basic human needs.
2.2,2.3,2.4,2.6	• differentiate between sexual and asexual plant propagation and reproduction.
2.1,2.2,2.3,2.5	• assess the environmental factors affecting plant growth and development.
2.1,2.2,2.3,2.4	• determine plant processes such as photosynthesis, respiration, and other processes.
2.2,2.3,2.4,2.5	• relate genetic processes to plant breeding and crop production.
2.2,2.3,2.4,2.5	• examine the plant cell and its related structures.
2.2,2.3,2.4,2.5	• explain seed germination and life cycles.
2.2,2.4,2.6	• summarize the physical and chemical properties of soil and other plant growing media.
2.2,2.3,2.4,2.5	• relate harvest and post harvest processes to various plants.
2.2,2.3,2.4,2.5	• appraise plant pest control and management.
2.2,2.3,2.4,2.5	• review plant ecosystems and sustainability
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Small Power Equipment

Course Description: This course is designed to develop skills in maintenance, repair, and operation of equipment, small combustion-type engine and electric motors. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.2, 2.7, 2.3,	• identify basic small engine parts and principles of operations and their applications in agriculture
2.37, 2.7, 1.1	• identify small engine systems: fuel/air, cooling, compression, ignition, lubrication.
1.1, 2.37	• perform maintenance schedules and procedures for agricultural small engines.
1.1,1.2,1.3,	• practice safe operation procedures and techniques when repairing or operating small engines.
2.1, 1.1	• perform small engine trouble shooting skills.
2.10, 2.7	• determine small engine specifications using precision measuring equipment.
2.7, 2.9, 2.10	• calculate piston displacement and compression ratio of a small engine.
2.9, 2.3, 2.37	• identify electric motor parts, principles of operations, and application in agriculture.
1.3,1.1,2.1,2.3	• service power transmissions.
2.37	• maintain, adjust and service small power machines utilized in agriculture.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Construction Skills

Course Description: Prepares students to construct and maintain agricultural structures and equipment. Develops basic skills such as: tool identification, interpreting plans, calculating a bill of materials, electrification, carpentry, welding, metal fabrication, plumbing, and masonry. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program. This course may be extended to two credits offered on a two-hour basis provided that instruction is enhanced with laboratory experience, project construction, and in-depth skill development.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3, 2.30, 2.37	• demonstrate safe usage of hand woodworking and metal working tools.
2.3, 2.30, 2.37	• demonstrate safe usage of portable and stationary power machines.
2.5,2.1,2.37,2.2	• employ safe usage of electric arc welding techniques and machines.
2.5,2.1,2.37,2.2	• employ safe usage of gas heating, cutting, welding, and brazing techniques and equipment.
2.1, 2.2, 2.37	• use plumbing tools and fixtures.
2.3,2.8,2.9,2.10	• utilize tools, techniques, and formulas for concrete construction.
2.1,2.2,2.3, 2.5	• demonstrate the basic principles of electricity.
2.1,2.3,2.8,2.9	• select proper painting materials and tools.
2.1,2.3,2.8,2.9	• develop project plans including plans and bill of materials for agricultural project construction.
2.19, 2.20	• relate the influence of agricultural mechanics industry on globalized production.
1.11, 2.13, 2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Structures and Designs

Course Description: This course prepares students to evaluate, design and construct agricultural structures. Students learn to design, evaluate and interpret construction plans and calculate a bill of materials. The skills learned in the Agricultural Construction Skills course may be incorporated to construct an agricultural structure. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program. It is recommended that students complete the Agricultural Construction Skills course prior to enrolling.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.1, 1.1, 5.1	• investigate location and arrangement of agricultural structures and enclosures.
2.7, 2.9, 2.3	• identify tools, techniques, and formulas for concrete and masonry construction.
1.1, 2.12	• relate electrical installations to the *National Electric Code* and local codes.
2.10, 2.7, 2.3	• layout and level sites using surveying equipment.
2.8, 1.1	• develop agricultural water and waste systems plans.
2.10, 2.3	• construct agricultural structures to conserve soil and water resources.
2.19, 2.3	• relate the influence of agricultural mechanics industry to globalized production.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Power and Machinery Operation

Course Description: This course provides instruction and hands-on experience in basic principles of agricultural machinery assembly, operation, maintenance, service, repair and safety. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program. This course may be extended to two credits and offered on a two-hour basis providing the instruction is enhanced with laboratory experience and in-depth skill development.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.20, 2.19	• identify the influence of agricultural mechanics industry on globalized production.
2.3, 2.37, 2.9	• relate basic engine parts to principles of operations.
2.3, 2.37, 2.2	• relate engine systems (carburation, compression, and ignition) to operation.
2.3, 2.37, 2.10	• identify and maintain transmissions and clutches.
2.3, 2.37, 2.10	• identify bearings types and seals.
2.3, 2.37, 2.9	• identify and maintain hydraulic systems.
1.1, 1.2, 5.5	• relate owner's manual and technical journals to specific equipment.
1.1, 1.2, 1.3	• follow maintenance schedules and procedures.
2.1,5.1,5.4,5.5	• develop troubleshooting skills.
5.1, 5.4, 6.2,	• demonstrate safe operation procedures and techniques.
2.8, 2.10, 5.5	• determine power requirements for optimum performance.
1.1, 2.6, 2.9	• develop a plan for preparing equipment for storage.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Floriculture / Floral Design

Course Description: Floriculture and floral design provides instruction to develop floral design techniques using silk, dried, and fresh flowers. Students will learn operation and management technics of a florist business as well as identification, production and cultural maintenance practices of plants used in floral design and interior landscaping. Content may be enhanced by utilizing appropriate technology. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3, 2.6,2.8,2.13	• relate floriculture/floral design practices to environmental impact.
2.22,2.23,2.9,5.2	• determine principles of design and elements of art in flower arranging.
2.5,6.1,2.9,2.22	• implement design skills in "real-world" connections.
2.22,2.23,6.1	• incorporate special techniques (bows, cards, wiring, tinting, etc.) into floral design.
2.3, 2.6, 5.1	• demonstrate techniques in conditioning and maintaining flowers and floral design materials.
1.1,2.3,2.10,5.1	• maintain industry-related equipment and materials.
1.1, 2.3, 5.4, 5.5	• apply safety regulations and practices.
2.33, 2.30,2.2	• formulate marketing plan.
2.3, 2.5,2.6,2.9	• apply principles of interior landscaping.
1.11, 2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.0, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Greenhouse Technology

Course Description: Greenhouse Technology provides instruction in greenhouse structures and greenhouse environment regulations. Plant growth and development and propagation are included as well as production and maintenance of bedding and container produced plants. Fundamental principles of vegetable production and commercial production of vegetable crops may be included. Content may be enhanced with appropriate technology. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.1, 1.16, 2.10	• propose greenhouse structural designs and equipment.
2.3,2.6,2.8,5.5	• manipulate greenhouse environmental conditions.
2.2,2.3,2.4, 2.10	• prepare soils and planting media.
2.3, 2.2, 2.4, 2.6	• investigate plant processes and development.
2.3, 2.2, 2.4, 2.6	• select plant propagation methods.
2.1, 2.3,2.7,2.8	• implement bedding and vegetable crop production and management strategies.
2.33, 2.30, 2.2	• formulate marketing plan for greenhouse plants and/or vegetable crops.
2.30, 2.16, 2.37	• demonstrate business and marketing procedures.
1.1, 2.10, 2.3	• maintain, operate and repair facilities and equipment.
1.1, 2.3, 5.4, 5.5	• apply safety regulations and practices.
1.11, 2.13, 2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Landscaping and Turf Management

Course Description: This course combines landscaping and turf management curriculum. The material includes identification of landscape plants and their characteristics, site evaluation, site design, calculation of materials needed, costs for bidding, and installing landscape plans. Landscape plant maintenance will also be presented. Selection, culture and management of turf species used for lawns, golf courses, athletic fields and erosion control may also be included. Content may be enhanced by utilizing appropriate technology. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.26, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.22,2.23, 2.10	• determine principles of design and elements of art in landscape design.
2.3, 2.6, 5.1, 5.4	• select appropriate plants for design.
2.7,2.8,2.9,2.10	• calculate costs of landscape plans for installation.
1.16,2.4,2.6,2.9	• recommend site preparation and landscape plan installation.
2.7,2.8,2.9, 2.10	• establish and maintain residential and commercial turf grass areas.
2.6,2.5,5.1,5.5	• formulate landscape and turf grass maintenance schedule.
2.7, 2.8,2.9,2.10	• calculate landscape maintenance costs
5.4,2.1	• maintain golf courses.
5.1,2.10,1.1,5.4	• maintain, operate and repair facilities and equipment.
2.10,1.1,5.1,5.4	• apply safety practices and regulations.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Nursery and Orchard Technology

Course Description: Nursery and orchard technology will provide instruction in production practices for container and field-grown nursery stock; identification, function, growing requirements, hardiness, problems and methods of different landscape plant materials; propagating and growing evergreens/deciduous plants; and the operation of garden centers and nurseries. Principles of home and commercial fruit production may also be included. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3,2.2,2.4,2.6	• investigate plant processes and plant development.
2.1,2.2,2.4,2.6	• demonstrate methods of plant propagation.
2.2,2.3,2.4,2.10	• prepare soils and planting media for nursery and/or orchard crops.
2.1,2.3,2.6,2.7	• implement production management strategies for nursery and/or orchard crops.
2.3,2.6,2.8,2.13	• relate nursery technology practices to environmental impact.
2.2,2.3,2.4,2.37	• demonstrate harvesting and merchandising of nursery crops and/or orchard crops.
2.16, 2.30, 2.33	• formulate marketing plan for nursery and/or orchard crops..
2.8,2.10,5.1,5.5	• design and construct growing structures.
1.1, 2.10, 2.3	• maintain, operate, and repair facilities and equipment.
1.1, 2..3, 2.4	• apply safety regulations and practices.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Agricultural Business / Farm Management

Course Description: This course introduces the free enterprise system, the study of economic principles, risk management, business law, budgets, finance, recordkeeping, and careers in agribusiness. Basic skills will be developed to manage a farm or agribusiness. Material will include: managing production/inventory, equipment, credit and taxes, market analysis and developing a business/farm plan. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.18, 2.30,5.1	• relate economic principles to agribusiness/farm management.
1.12, 2.7, 2.8	• evaluate record keeping systems and procedures in agribusiness or farming.
1.1, 2.18,6.1	• investigate sources of capital for agriculture.
2.37, 5.5, 6.1	• relate government policies and business law to agriculture.
1.1, 2.37, 5.1	• identify agribusiness functions critical to success with minimizing risk.
2.11, 5.5, 5.5	• prepare budgets determining financial needs, costs, and loan repayments.
2.7, 2.8, 2.12	• analyze inventories to asset values, net worth, efficiency and production.
2.2, 5.1, 6.2	• explore marketing options available to agricultural products.
2.18, 2.37, 5.1	• plan marketing strategies for agriculture products.
2.37, 5.4, 5.5	• manage human resources in agriculture.
1.1, 1.6, 2.37	• discuss GPS (global positioning systems) and their influence on agriculture.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Agricultural Employability Skills

Course Description: Agricultural employability skills provides opportunities to develop skills in: job searching, preparing resumes, writing letters of application, job interviews, attitude at work, communicating effectively, human relations and accepting responsibilities. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.37, 2.18, 5.2	• recommend Entrepreneurship and business training opportunities for agriculture to the community.
2.30, 5.4, 2.37	• compare agricultural business organizations and regulations.
2.17, 2.37, 5.4	• practice interpersonal relationships and communications.
2.37,2.38,2.17	• improve individual and group management skills.
2.37, 5.1, 5.4	• manage records and information systems for agriculture.
2.37,2.18,2.30	• manage capital resources for agriculture.
2.37, 2.16, 6.2	• investigate employer/employee responsibility.
1.16, 2.37, 5.1	• apply technology in agricultural employment industry.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Sales and Marketing

Course Description: This course provides an introduction to agricultural sales and marketing, including. Course material will include: competition in the agriculture market place, marketing decisions, types of markets, contracting, government programs and regulations, personal development, employee and employer responsibilities, communications, promotion strategies, records, files, purchasing materials, stocking, selling and business account procedures. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.16, 2.37	• relate interpersonal skills to success in agricultural sales and marketing.
1.4, 2.17, 2.37	• demonstrate effective verbal and written communications skills in agricultural sales and marketing.
2.37, 5.5, 6.1	• dramatize effective salesmanship techniques in agricultural sales and marketing.
1.16,2.37,5.4	• advertise and promote agricultural products.
2.2, 5.1, 6.2	• explore marketing options for agricultural products.
5.1, 2.37, 6.1	• utilize agricultural business procedures and record keeping.
2.18, 2.37, 5.1	• formulate a marketing plan for agricultural products.
1.16, 2.37	• utilize technology in agricultural sales and marketing.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Bio-Technology

Course Description: Biotechnology in agriculture is designed to emphasize the interrelationship of science and technology and the impact of this technology on agriculture and agricultural products. The curriculum includes: career opportunities in the agricultural biotechnology industry; basic concepts about biotechnology; how genetic information is transferred and changed by engineering; opportunities, impacts and public issues concerning biotechnology; the processes and applications of biotechnology in plant and animal science; and the applications of microbial biotechnology in agriculture. Content will be enhanced with appropriate applied science laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.16, 2.7, 2.8	• investigate basic concepts about biotechnology in agriculture.
2.4, 2.13, 2.2	• analyze how genetic information is transferred and changed.
2.1,2.16, 2.18	• debate opportunities, impacts, and public issues concerning biotechnology.
1.10, 5.1, 5.3	• investigate the processes and applications of biotechnology in plant science.
1.10, 5.1, 5.3	• investigate the processes and applications of biotechnology in animal science.
1.10, 5.1, 5.3	• investigate the applications of microbial biotechnology in agriculture.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience programs and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Agricultural Communications

Course Description: This course develops an understanding of fundamental skills necessary to be successful in the agricultural communications industry. Provides guided practice and applied experience utilizing various styles of communication including oral, written, and electronic communications. Techniques of communications will include: traditional print media, brochure development, photography, videography, computer program applications, and Internet usage including e-mail. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.12	• develop skills in public, extemporaneous and impromptu speaking.
5.4, 2.16	• communicate to resolve conflict and promote team building.
1.16	• perform computer skills related to word processing, desktop publishing,
	• multimedia presentations and computer graphics.
2.37	• develop skills related to proper telephone usage.
1.11	• develop skills to produce print quality newspaper and magazine articles.
2.22,1.16	• develop skills to produce brochures and sale ads.
1.13	• develop skills for photography and videography used in communications.
1.12	• utilize skills developed to produce radio and television ads/promotions.
1.16	• develop skills needed to produce multimedia presentations.
1.16	• utilize the Internet for research, E-mail, and basic communication processes.
1.15, 2.16	• understand how non-verbal communication plays a part in interpersonal development.
1.10,2.30	• conduct meetings by using parliamentary procedure.
2.38	• learn to develop and complete professional quality resumes.
2.38	• learn techniques to assist in applying and interviewing for a job.
1.1, 2.30	• demonstrate the ability to do market research and organization for presentations.
1.11, 2.37	• plan, organize and deliver a sales presentation.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Aquaculture

Course Description: This course is an introduction to aquacultural science. Instruction provides the fundamentals of aquatic plant and animal biology, anatomy/morphology and physiology in aquaculture, and the unique properties of water for aquaculture. Instruction also includes fish and aquatic crop production principles, management and marketing. Applications of biotechnology in aquaculture, and aquaculture as sustainable agriculture is also included. Content will be enhanced with appropriate applied scientific laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3, 2.4	• relate the fundamentals of aquatic plant and animal biology to production
2.10, 5.5, 6.3	• analyze the unique chemical properties of water for aquaculture.
2.13, 5.1	• demonstrate principles of aquacrop production from species selection to seed production to harvesting to processing.
2.2, 2.18, 5.2	• describe the components of managing the aquafarm and the marketing of aquacrops.
6.1, 2.6	• determine applications of biotechnology in aquaculture.
2.20, 2.19	• evaluate aquaculture as sustainable agriculture.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Environmental Technology

Course Description: This course is an intermediate scientific study of environmental technology. It is designed to develop an awareness of environmental concerns related to air, water, soil, land use management, waste management, and their interrelationship with the biological ecosystem. Soil formation, conservation and evaluation material will also be included. Content will be enhanced with appropriate computer applications, scientific laboratory activities, field experimentation, community development projects, and occupational development. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.19, 2.2, 2.5	• distinguish the importance of conserving and managing our natural resources to maintain a high standard of living.
2.19, 2.2, 2.5	• investigate the various types of ecosystems and management skills for a productive life cycle.
2.1, 2.19, 2.20	• relate the physical properties of soil and its effect to the different aspects of the environment.
2.1, 5.4, 6.1	• relate environmental issues to the management of waste products.
2.15,2.14,5.1	• investigate the effects of land use and environmental legislation in multiple use planning.
2.15,2.30,2.18	• relate the proper handling, application and disposal of chemicals to protection of the environmental balance.
2.13, 2.1, 4.4	• analyze the importance of air and water quality on society to ensure and improve sustainable standards.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Food Technology

Course Description: Food Technology introduces the issues of world food production and the preparing, processing, and packaging of food. The government regulations regarding foods and the exploration of career opportunities will also be covered. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.15, 2.16, 2.20	• determine trends in world and U. S. food production.
2.18, 2.30, 2.31	• relate the food industry to the consumer, including food labeling and economics.
2.1,2.3, 2.4,2.6	• investigate food safety issues from farm to retail, including microbial problems, risk assessment, food handling and HAACP concepts.
2.29,2.3,2.10	• compare nutrient components of different food products and their effects on consumer's health.
2.3, 2.9,2.8, 2.7	• construct processing, inspection, fabrication, preserving, storing and marketing aspects of the meat industry.
2.18, 2.30, 5.1	• identify the wholesale and retail cuts of the meat animal carcass.
2.30, 5.1, 2.18	• investigate the egg industry from grading to marketing.
2.30, 5.1, 2.18	• investigate production methods and marketing of dairy products.
2.30, 5.1, 2.18	• compare processing and marketing of small grains products, fruits, and vegetables.
1.11, 2.13, 2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

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- Secretary's Commission on Achieving Necessary Skills (SCANS)
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Forestry

Course Description: This course introduces the science of silviculture. The course includes career opportunities, tree identification, tree production, forestry management, timber harvesting, wood utilization and the environmental and ecological aspects of forestry. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.1, 2.31, 2.3	• utilize forestry tools and equipment.
1.1, 1.16,1.3 1.9	• survey land and cruise timber .
1.1,1.2,1.10, 2.1	• investigate physical characteristics of trees, plant processes, growth and taxonomy.
1.1, 1.2, 1.3, 2.1	• recommend management practices including: genetic potential, reforestation, timber stand improvement, and harvesting.
1.1, 1.2, 1.3, 2.1	• investigate environmental, social , and economic value of forest.
1.1,1.2,1.3,1.16	• investigate the influence/importance of forestry from local to global level..
1.1,1.2,1.3,1.10	• distinguish wood characteristics including wood properties, products, wood identification and physiology.
1.1, 1.2, 1.3, 2.1	• evaluate methods for forest protection from insect, disease and other destructive agents.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Small and Specialty Animal Technology

Course Description: This course develops scientific knowledge, management practices, and marketing strategies in small and specialty animal technology. The curriculum includes identification, anatomy, physiology, nutrition, health, selection and care of small animals such as dogs, cats, rabbits, companion birds, ostriches, emus, tropical fish, and fur bearers. Content will be enhanced with appropriate applied scientific laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.6, 2.9, 2.17	• relate small animal technology to current world trends.
2.3, 2.6,2.20	• describe the distinguishing characteristics of the different breeds of small and specialty animal species.
2.1, 2.3	• describe and compare the physiology and anatomy of small animal species.
2.2, 2.5, 2.6	• describe and compare the process of reproduction of small animal species.
2.1,2.2,2.3,5.3	• analyze the nutritional requirements of small and specialty animal species.
2.33, 2.8, 2.10	• describe the care, handling, sheltering, and grooming of small animals.
2.4, 2.6	• investigate diseases and plan a health maintenance schedule in small animals.
2.2, 2.18, 5.2	• evaluate the management and marketing of small animal services and products.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Wildlife Resources

Course Description: Develops an awareness of wildlife industry resources. The course includes: a study of ecology and ecosystems, wildlife habitat, population dynamics ,management technics that deal with wildlife in all areas and the regulations that effect the wildlife industry. Content may be enhanced with appropriate applied scientific laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1,2.36,2.38	• demonstrate employability and social skills relative to the career cluster.
2.2,2.3,2.4,2.5	• analyze the dynamics of an ecosystem.
2.2,2.3,2.4,2.5	• examine the diverse components of habitat and it's relation to wildlife.
2.1,2.9, 2.11	• calculate the population dynamics that relate to wildlife.
2.14,2.18,2.20	• identify the human role in wildlife and habitat management as it applies to • historic, social, political, and economic concerns.
2.2, 2.3, 2.5	• examine the human impact on wildlife resources.
2.14,1.10,1.11	• examine the Federal and State Laws and Regulation that pertain the • conservation and preservation of wildlife.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

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- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Advanced Wildlife Management

Course Description: A freshman-level college course which provides students with an overview of wildlife ecology and management. Emphasis is placed on the multifaceted nature of wildlife ecology, the importance of wildlife in our culture, and the relationships among wildlife and other natural resources. Opportunity will be provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by appropriate computer applications. Leadership development will be provided through FFA. Student agricultural experience programs will enhance program benefits.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.2, 2.6	• define wildlife and the wildlife management process.
2.20	• recount the history and legislation as it relates to wildlife and endangered species.
2.5, 2.6	• interpret the basic ecological principles and their related habitat requirements for different wildlife species.
2.1, 2.3	• review the agricultural, forest, and range land management practices.
2.1, 2.2	• explain wetlands, wetland ecology, and management and waterfowl management.
2.3, 2.6	• examine the attributes of population, population interaction, and abundance.
2.2, 2.4	• formulate management practices for backyard wildlife damage, wildlife harvest, and biodiversity.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

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Advanced Agricultural Economics and Agribusiness Management

Course Description: A freshman level college course, which introduces students to the field of agricultural economics and agribusiness management. The course covers basic treads occurring in agriculture including the role of the food system in the U.S. and world economics. Concepts and tools for economic decision-making are covered in the context of current social and economic issues. Topics include: overview of the food and fiber industry, international trade, supply and demand, macroeconomics, careers, marketing, rural development, personal finance, futures markets, and biotechnology.

Academic Expectations	Content/Process
2.16, 2.18	• Introduction to Agricultural Economics and Agribusiness: Including key definitions, sectors, major concepts, and an introduction to graphics and index numbers.
2.16, 2.18	• Overview of the Food and Farm System: Including trends in production agriculture, importance of the food system to the US economic, myths about the food system and farming, vertical integration, cooperatives, corporations, and the importance of agriculture to the local economy.
2.16, 2.18	• International Agriculture: Including world trends in food production, consumption, and population growth; food aid; trends in US and world food trade; trade balances; types of exports; major markets; imports; trade fluctuations; policy impacts; importance of trade to agriculture; foreign affiliate sales; and US agriculture competitiveness in the world market.
2.18	• Theory of Demand: Including the role of households in the economy, utility, diminishing marginal utility, demand, calculation of demand elasticity, degrees of elasticity, and changes in demand.
2.18	• An Overview of the Theories Related to Production and Resource Use: Including fixed and variable inputs, production schedules, stages of production, and the law of diminishing returns.
2.18	• Cost of Production and Optimal Resource Use: Including the calculation and graphing of short run costs, determining the optimal level of resource use, and defining and calculating supply elasticity.
2.18, 6.1, 6.3	• Making Decisions When Two Variable Inputs are Used or When Two Products May Be Produced: Including determining the optimal level of resource use between two variable inputs and determining what to produced when more than one enterprise is possible.
2.18	• Supply and Supply Elasticities: Including the concept of supply, short run supply, market supply, elasticity of supply, price determination, and supply surpluses and shortages.
2.18, 6.1	• Market Equilibrium: Including the laws of supply and demand, constructing

	supply and demand curves, movements along and shifts of supply and demand curves, perfect competition, and market and price equilibriums.
2.18, 6.1	• Biotechnology: Including defining biotechnology and its relationship to the food and fiber sector, world food supply trends, changes in agricultural productivity, the Green Revolution, and the effects of biotechnology on production, demand, and the supply curve.
2.18	• Market Models of Perfect and Imperfect Competition: Including the levels and characteristics of market competition, profit maximization, graphic impacts of supply and demand changes, price and quantity determination, and the effects of competition of economic efficiency.
2.18	• Marketing: Including key definitions, sectors, the structure of US agriculture, the value-added process, the marketing bill, and export markets.
2.18, 5.1, 5.4, 5.5	• Risk Management: Including futures contracts, speculation, hedging, and how farmers and processor use futures markets to reduce price risk.
2.18, 6.1	• Macroeconomic Concepts: Including the key definitions, the circular flow of wealth, gross domestic product, unemployment, inflation, interest rates, foreign exchange rates, current account, the business cycle, policy tools, and macroeconomic policy goals in the US.
2.18, 6.1	• Macroeconomic Linkages to Agriculture: Including the basic policy linkages between agriculture and the total economy, the interface of macroeconomic policy and agriculture during the last three decades, and the effects of interest rates, inflation, and foreign exchange rates on the agricultural sector.
2.14, 2.18	• Rural Development: including its component parts, its importance to farm and rural communities, issues and trends in rural communities, and classification of counties by major income source.
2.18, 2.30	• Personal Finance: Including checks and other money instruments, checking accounts, savings accounts, credit cards, budgeting, and managing your spending style.
2.36, 2.37, 2.38	• Careers in Agricultural Economics: Including the kinds of jobs that people might take with degrees in agricultural economics.

Veterinary Science

Course Description: This course introduces students to the field of veterinary science. Major topics include veterinary terminology, safety, sanitation, anatomy/physiology, clinical exams, hospital procedures, parasitology, posology, laboratory techniques, nutrition, disease, office management, and animal management. Careers are also explored. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 1.2, 1.3, 1.4, 1.5	• Examine proper safety and sanitation techniques when handling various animal species.
1.1, 1.2, 1.3, 1.4, 1.10, 1.11, 1.12, 2.1	• Discuss and explain multiple veterinary concepts and terminology.
1.2, 2.1, 2.3, 2.4, 5.1	• Compare, examine, and identify the anatomy and physiology of various animal species using proper veterinary terminology.
2.1, 2.3, 2.4, 5.1, 5.4	• Take part in clinical exams of an assortment of animal species
1.1, 1.2, 1.3, 1.11, 1.12, 5.1, 6.1	• Examine appropriate hospital procedures and discover ways to apply them to veterinary science practices.
2.1, 2.3, 2.4	• Define and differentiate among the various parasites, their causes, symptoms, treatments, and the animal species that can be affected.
1.5, 1.6, 1.7, 1.8, 1.9, 2.7, 2.8, 2.9, 2.10, 2.11, 2.13	• Discover how to utilize mathematical skills in the field of veterinary science.
2.1, 5.1, 6.1 2.1, 2.3, 2.4	• Develop laboratory techniques and take part in activities and procedures to further assist with the various veterinary science concepts.
2.1, 2.3, 2.4	• Define nutrient, list the nutrient groups, explain their functions, and explain how feed are balanced to meet nutrient requirements of animals.
2.1, 2.3, 2.4, 5.1, 6.1	• Explain and discuss the principals of disease and evaluate how they affect numerous animal species.
	• Discuss appropriate animal management practices and how they relate to veterinary science.
1.11, 2.13, 2.18	• Maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37 1.9, 1.10, 1.12	• Utilize activities of FFA as an integral component of course content and leadership development.

	• Apply science, math and communication skills within the technical content.

Connections

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- Secretary's Commission on Achieving Necessary Skills (SCANS)
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